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The Journal of

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# A STUDY OF CHINESE AMERICAN CHILDREN

## I. DIETARY STUDY*

JEAN ELIZABETH HAWKS, M.S.**

It is not known whether the small size of Oriental peoples as compared with Occidentals is due to environment or to racial characteristics. If environment is the influential factor, the question arises as to whether changed conditions of living and alteration of diet might affect the metabolic processes and consequently the stature of children born to Orientals who have lived for some time in America. The present investigation is an attempt to throw some light on this problem by intensive individual studies on twenty-two Chinese children living in Chicago. It includes chemical analyses[1] of their diets for energy value, protein, calcium and phosphorus; determinations of their basal metabolism; and a report of their physical measurements. The results are compared with both Chinese and American values. This paper presents the dietary study. Other aspects will be reported in subsequent articles.

### SURVEY OF LITERATURE

Although much has been written about Chinese diet and its probable adequacy, the quantitative studies in which data for children are included are relatively few in number. For the sake of economy in discussion, the important points concerning these are summarized in table 1. None

* From the Nelson Morris Institute for Medical Research, Michael Reese Hospital, Chicago, and from the Department of Home Economics, University of Chicago. Received for publication September 5, 1931.

** The data are taken from the dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the Department of Home Economics, University of Chicago.

[1] The writer wishes to acknowledge the technical assistance of Mildred Kaucher, B.S.

TABLE 1

*Dietary studies reported from China*

| AUTHOR | DATE | LOCATION OF STUDY | TYPE OF INVENTORY STUDY | TYPE OF PEOPLE | LENGTH OF STUDY | SUBJECTS | | | UNIT OF MEASUREMENT | CALORIES | | PROTEIN | | CALCIUM | PHOSPHORUS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Adult | Children | | | | | | | | |
| | | | | | | Number | Number | Age | | Total | Cereals | Total | Animal | | |
| | | | | | *days* | | | | | | *per cent* | *grams* | *grams* | *grams* | *grams* |
| Van Buskirk | 1921 | Korea | Institution | Mission school pupils | 30–90 | 58 | 528 | | Individual | 2,727 | 89.0 | 90.9 | 5.2 | | |
| | 1922 | Korea | Institution | Working men | 30–90 | 23 | | | Adult male | 2,366 | 79.0 | 89.0 | 16.0 | | |
| Adolph | 1923 | North China | Home | Middle class | 21–70 | 147 | 76 | 1–12 | Adult male | 2,922 | 87.0 | 111.1 | 5.3 | | |
| | 1925 | North China | Home | Middle class | 21–70 | 340 | 114 | 1–12 | Adult male | 2,471 | 87.0 | 77.9 | 4.7 | | |
| Hammond and Sheng | 1925 | Peking | Individual | Boys in home for poor | 2 | | 96 | 6.5 | Theoretical | 900 | | 25.0 | 5.0 | | |
| | | | | | | | | 10.5 | children | 1,000 | | 40.0 | 5.0 | | |
| | | | | | | | | 14.5 | | 1,700 | | 55.0 | 5.0 | | |
| Wu and Wu | 1928 | North China | Home | Middle class | 7 | 146 | 47 | 1–18 | Adult male | 2,901 | 72.0 | 86.1 | 9.1 | 0.327 | 1.130 |
| | | North China | Home | Farmers | 7 | 76 | 33 | 1–18 | Adult male | 3,139 | 83.3 | 94.3 | 7.7 | 0.382 | 1.552 |
| | | North China | Institution | College students | 30 | 299 | | | Adult male | 3,044 | 77.8 | 95.5 | 25.0 | 0.325 | 1.110 |
| | | North China | Institution | Middle school pupils | 7 | 150 | | | Adult male | 2,746 | 80.0 | 90.1 | 7.0 | 0.346 | 1.081 |
| | | North China | Home | Factory employees | 30 | 138 | 104 | 1–18 | Adult male | 3,141 | 93.1 | 92.3 | 0.8 | 0.278 | 0.958 |
| | | North China | Home | Factory employees | 7 | 84 | | | Adult male | 3,889 | 85.9 | 92.1 | 9.3 | 0.367 | 1.236 |
| | | North China | Institution | Restaurant patrons | 38 | Many | | | Adult male | 3,000 | 91.6 | 94.4 | 4.3 | 0.228 | 0.913 |
| | | | | Average of all types | | 893 | 184 | 1–18 | Adult male | 2,977 | 82.0 | 91.7 | 9.7 | 0.337 | 1.178 |
| Tao | 1928 | Peking | Home | Poor families | 180 | 115 | 105 | 1–17 | Adult male | 2,595 | 92.7 | 75.9 | 1.3 | | |
| | | Peking | Economic | School teachers | 30 | 43 | 18 | 1–17 | Adult male | 2,742 | 80.4 | 84.3 | 6.4 | | |

of these studies was made in South China, the section from which the parents of the children of this study came. All authors state, however, that the essential difference between diets in northern and southern China is that rice is the principal cereal used in the South, while wheat is used in the North.

With the exception of two studies made in Korea (37, 38), all investigations were conducted in or near Peking. There were two institutional studies, all the others having been made in the homes of people whose diets were representative of the poor or middle classes. Adolph's (1, 2) investigation was made with the aid of 30 students of Shantung Christian University, who weighed all food consumed in their own homes during one summer month. The report of Wu and Wu (49) includes studies of seven groups, a portion of the results having been previously published (23, 44, 45). The basis of Tao's (34) conclusions is a study of the expense accounts of families living in Peking.

From the standpoint of procedure none of the results can be considered entirely adequate. Most of the studies were made by the inventory method and children's intakes were evaluated in terms of an adult male unit. This unit varied greatly. In some cases a child was counted half of an adult up to 12 years and an adult thereafter, in other cases a sliding scale was used similar to that of Atwater (9). All studies give values for calories and protein, and Wu and Wu also report figures for calcium and phosphorus. Computations were made from American tables of average composition of foods, and were supplemented by data available from analyses of Chinese foods made by Levene and Cadbury (21), Sherman and Wong (32), Wu (47), and others (6, 7, 8, 15, 43).

The results reported in all these inventory studies are similar. Bulky carbohydrate diets furnished from 2366 to 3889 calories per adult male unit. Cereals provided from 72 to 93 per cent of these calories. Total protein varied from 75.9 to 111.1 grams, but the proportion of animal protein was exceedingly low, ranging, in the majority of reports, from 1.3 to 9.3 grams daily. Adolph (4) and others (16, 24, 36, 48) state that the degree to which the protein is utilized in the alimentary canal may be reduced by an excessive bulk of food to from 40 to 60 per cent of its original value. Thus they believe that these diets were suboptimal in protein. Calcium was low in the diets in which it was computed, averaging only 0.337 gram per day; phosphorus was about the same as that in an average American diet. The low calcium content might be accounted for by the absence of milk, as its use was noted in but few families.

Hammond and Shen (17) attempted the only individual study which has been reported on children and conducted it in a home for poor boys. These authors computed values for three theoretical children, 8, 12, and 16 years of age, by weighing the food consumed by a number of different children during two days. Since a Chinese child is considered one year old when he is born and another year is added to his age on the next lunar New Year, even if it occurs the day following his birth, Hammond and Sheng, in order to compare their data with American standards, reduced the given ages of these boys one and one half years. This procedure diminished the accuracy of the results, as did the fact that the investigators added 5 grams of fat and 5 grams of meat routinely to each diet, regardless of the age of the child. The figures for the intakes of these children are extremely low, not more than half of Holt's standards for either calories or protein.

The impression given by the foregoing studies, together with a number of general discussions (3, 4, 5, 13, 45, 46) on the subject of Chinese diets, is that the diet is not adequate for optimum growth and development. Since cereals furnished such a large proportion of the diets studied there is a question as to whether all the essentials could have been supplied. In fact, Wu and Wu (49) state: "The Chinese diet is adequate in energy, probably adequate in vitamins B and C, suboptimal in protein and vitamins A and D, and deficient in calcium."

This view, however, must not be accepted without discussing the other side of the question, since the Chinese race has existed on similar food for centuries. Computations of typical diets show that they may be adequate in the constituents considered essential in the Western world, although they are close to the lower margin in their calcium contents. According to Wang (40) the diet is not suboptimal in protein. Meat, fish, and the glandular organs of animals, as well as the blood, are commonly eaten; eggs are served every day; and soy beans, which contain considerable protein, are always included in Chinese diets. She also states that many minerals and vitamins are supplied by large amounts of green vegetables and melons of numerous varieties which are eaten daily.

It is probable, however, that the diets of different classes throughout China vary greatly since Milam (25) has shown in a study of economic conditions that well-to-do families spend proportionally more money for meat, fish, eggs, sweets and fruit, and less for cereals than poor families. It is also possible that dietary conditions are changing with economic conditions in China, and that the influence of Western civilization is

resulting in the use of highly milled products, such as polished rice and white flour, in place of the whole grain cereals. Wu (45) says that meat is so expensive today that it is served in smaller quantities with larger amounts of vegetables than formerly. Eggs, which have also increased in price, are less extensively used, and Tso (35) fears that their omission from the present day diet will cause a serious condition since they furnish the vitamin which produces an efficient utilization of the small amount of calcium. These changes have produced conditions described by Adolph (5) in his most recent article, in which he says that the poorer classes of Chinese constantly live on the verge of starvation. He bases his statement on famine studies which show that a slight lowering of quantity or quality of the food produces immediate disaster.

This literature shows that many more investigations on dietary conditions in China are needed before the results can be considered accurate enough for comparative standards.

## EXPERIMENTAL PROCEDURE

Through a Chinese interpreter,[2] 22 Chinese children in 11 families living in Chicago were secured as subjects for the present investigation. With the exception of M., who was 17 years old, the 12 boys and 10 girls were between the ages of 5 and 14 years. Twelve lived in the crowded Chinese district, while the others, whose parents were of higher financial status, resided in neighborhoods where living conditions were better. All were of Cantonese parentage. Nineteen were natives of Chicago and were of the first generation born in America, while 3 were born in China. With the exception of the 4 children in the C. family, who were neglected and undernourished, the subjects appeared to be in good physical condition, although they were undersized for their ages according to American standards.

An individual dietary study was conducted in the home of each child during two consecutive days. The observer arrived each morning before breakfast and remained until bed time. It was believed that any psychological effects on the children which might have altered their food consumption had been reduced to a minimum. They were all well acquainted with the observer, who had visited their homes many times during the previous months for the purpose of taking them back and forth to the hospital for weighing and measuring, and for repeated metabolic tests which had been made previous to the dietary study.[3]

[2] Grateful acknowledgment is made to Miss Rose Lee for acting in this capacity.

[3] II. Physical Measurements will appear in the March, 1932, JOURNAL.

Through the interpreter, the mothers had been instructed to select and prepare food to which the children had been accustomed, and to avoid undue disturbance of the usual routine of home life.

All food was weighed as consumed, proper corrections being made for any that was left on the plate. When possible, dissimilar foods in mixtures, for example, meats and vegetables, were separated before weighing. A tested Chatillon balance was used and a sample of each food was immediately removed to a bottle and tightly corked. All food eaten between meals was also weighed. In the case of the undernourished girl, T. C., who was required by the school physician to eat lunch at school, the observer went to the school to weigh her food. The samples of food were dried at a temperature between 70 and 80°C., ground and thoroughly mixed. If a food contained a large proportion of fat, it was first quantitatively extracted with ether.

The caloric value was determined in an adiabatic bomb calorimeter designed by Benedict and Higgins (12). Weighed portions of the pulverized samples were made into pellets before burning. Nitrogen was determined by the usual Kjeldahl method and the factor 6.25 was used to convert it into protein. The quantity of dried material obtained from many of the semi-liquid foods was so small that micro-methods were used for estimating both calcium and phosphorus. The calcium was determined according to a modification of the Kramer and Tisdall (20) method for serum,[4] and the phosphorus according to the modification of the Bell and Doisy (11) method, as described by Wang, Kern and Kaucher (42).

## RESULTS

### *Character of diets*

Table 2 shows the frequency of occurrence of the principal foods, and the amounts eaten by the 22 children at 132 observed meals. As might be expected, polished rice occupied a prominent place in the diets.

[4] A sample containing from 1 to 5 mgm. of calcium was ashed in the presence of 5 drops of concentrated sulphuric acid. The residue was transferred with 15 cc. of 10 per cent hydrochloric acid to a 50 cc. conical centrifuge tube, and 1 cc. of 40 per cent sodium acetate, 2 cc. of saturated ammonium oxalate and 3 cc. of saturated oxalic acid were added. The acidity was adjusted with ammonium hydroxide to a pH between 4.8 and 5.4, using methyl red, suggested by Stohl (33), as the indicator. After standing over night, the mixture was centrifuged and the precipitate washed twice with dilute ammonium hydroxide (2 cc. of concentrated ammonia to 100 cc. of distilled water). Five cubic centimeters of 10 per cent sulphuric acid were added and the mixture titrated at a temperature between 60 and 80°C. with N/100 potassium permanganate.

It was never served for breakfast; but, except to 3 children, it was served at least 3 times, and to 12 children, 4 times or more, during the two days. Two children had none at all, but the average amount of cooked rice eaten daily by the other 20 children was 304 grams. Four children had over 500 grams. Other cereals were used to some extent. Cream of wheat, oatmeal, or corn flakes and white bread were served at some breakfasts. Hot muffins were eaten in one family and sandwiches in another.

TABLE 2

*Weight of food eaten and times served per day*

| FOOD | WEIGHT OF FOOD SERVED | | | | TIMES SERVED | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Average serving | | | | Average | |
| | Maximum | Minimum | Children served | All children | Maximum | Minimum | Children served | All children |
| | *grams* | *grams* | *grams* | *grams* | | | | |
| Rice (cooked) | 665 | 0 | 303.8 | 276.3 | 3.0 | 0.0 | 2.0 | 1.8 |
| Other cereals | 200 | 37 | 93.5 | 93.5 | 5.0 | 1.0 | 2.1 | 2.1 |
| Vegetables* | 263 | 47 | 132.9 | 132.9 | 4.0 | 1.0 | 2.1 | 2.1 |
| Fruits | 308 | 0 | 136.6 | 120.8 | 3.5 | 0.0 | 1.3 | 1.2 |
| Milk | 654 | 89 | 267.6 | 267.6 | 2.5 | 0.5 | 1.4 | 1.4 |
| Butter | 17 | 0 | 8.8 | 8.4 | 1.5 | 0.0 | 0.9 | 0.9 |
| Eggs | 97 | 0 | 48.7 | 35.4 | 1.5 | 0.0 | 1.0 | 0.6 |
| Meat, fish and chicken | 270 | 0 | 167.7 | 152.4 | 3.0 | 0.0 | 2.4 | 2.2 |
| Soup | 285 | 0 | 128.8 | 117.2 | 1.5 | 0.0 | 1.0 | 0.8 |
| Sugar | 24 | 0 | 8.6 | 7.0 | 2.0 | 0.0 | 0.7 | 0.6 |
| Tea | 179 | 0 | 111.5 | 20.7 | 2.0 | 0.0 | 0.8 | 0.1 |

* About 50 per cent were leafy vegetables.

All but 3 children had fresh fruit once a day or oftener, usually between meals. Every child had vegetables at least once a day, the average amount being 133 grams. The vegetables were seldom cooked or served alone, but were usually combined with fried meat, flavored with soy bean sauce, or oriental spices, and steamed about ten minutes. Since the time of cooking was short and little water was used in the procedure, the minerals and vitamins in the vegetables were probably preserved. Meat and vegetable soup was commonly used, 12 children having it each day. Fish and chicken, however, were cooked and served alone, often at the same meal with pork. Eleven of the children had approximately 200 grams, or almost half a pound of meat, fish, or chicken each day.

Further protein was supplied by eggs and milk. Sixteen children had eggs in some form, 10 having had the equivalent of one or more per day. Milk appeared in all diets. Three children had approximately a pint, while 14 had less than half a pint each day. This milk was used in cocoa,

TABLE 3

*Grams of food per twenty-four hours calculated on the basis of fresh and dried weight*

| CHILD | AGE | WEIGHT | TOTAL WEIGHT OF FOOD | | WEIGHT PER KILOGRAM | | PERCENTAGE OF WATER IN DIETS |
|---|---|---|---|---|---|---|---|
| | | | Fresh | Dried | Fresh | Dried | |
| **Boys** | | | | | | | |
| | *years* | *kgm.* | *grams* | *grams* | *grams* | *grams* | |
| E. C | 5 | 13.2 | 1,008 | 207 | 76.4 | 15.7 | 79.5 |
| E. E. | 5 | 15.9 | 1,074 | 219 | 67.5 | 13.8 | 79.6 |
| H. I. | 5 | 16.3 | 1,232 | 285 | 75.6 | 17.5 | 76.9 |
| He. I. | 7 | 18.2 | 1,305 | 320 | 71.7 | 17.6 | 75.5 |
| W. F. | 8 | 18.5 | 1,427 | 385 | 77.1 | 20.8 | 73.0 |
| G. E. | 9 | 19.4 | 1,049 | 287 | 54.1 | 14.8 | 72.7 |
| Sh. C. | 9 | 20.7 | 1,303 | 293 | 62.9 | 14.2 | 77.5 |
| S. D. | 9 | 23.1 | 1,848 | 523 | 80.0 | 22.6 | 71.8 |
| V. F. | 10 | 26.7 | 1,734 | 473 | 64.9 | 17.7 | 72.7 |
| H. T. | 10 | 28.6 | 1,474 | 426 | 51.5 | 14.9 | 71.1 |
| F. E. | 11 | 26.5 | 1,258 | 370 | 47.5 | 13.9 | 70.6 |
| St. C. | 11 | 29.5 | 1,160 | 330 | 39.3 | 11.2 | 71.5 |
| Average | | | 1,323 | 343 | 64.0 | 16.2 | 74.4 |
| **Girls** | | | | | | | |
| M. Y. | 5 | 16.2 | 1,434 | 240 | 88.5 | 14.8 | 83.3 |
| P. A. | 6 | 15.0 | 1,094 | 209 | 72.9 | 13.9 | 80.9 |
| H. A. | 7 | 16.6 | 1,098 | 238 | 66.1 | 14.4 | 78.3 |
| J. E. | 7 | 18.1 | 1,002 | 268 | 55.4 | 15.8 | 73.3 |
| G. M. | 9 | 20.8 | 1,273 | 368 | 61.2 | 17.7 | 71.1 |
| L. L. | 9 | 23.2 | 1,788 | 322 | 77.1 | 13.9 | 82.0 |
| L. F. | 12 | 34.4 | 1,948 | 533 | 56.6 | 15.5 | 72.6 |
| T. C. | 13 | 27.6 | 1,630 | 380 | 59.1 | 13.8 | 76.7 |
| J. T. | 14 | 34.6 | 1,470 | 438 | 42.5 | 12.7 | 70.2 |
| M.* | 17 | 47.0 | 1,657 | 483 | 35.3 | 10.3 | 70.8 |
| Average | | | 1,415 | 333 | 64.4 | 14.7 | 76.5 |

* Omitted from average.

on cereals, or as milk to drink, almost none being used in cooking. Butter was little used, the average amount per child per day being 8 grams. It was practically never used in cooking. Sugar was used in small quantities also. The children were never served sweet desserts,

custards, pie, pudding, or ice cream, although they sometimes had cookies or cake. Contrary to expectation, only 4 of the children had tea, and this was in but small amounts and very weak.

It is seen in the foregoing discussion that many of the characteristics of diets used in China have been retained in these American homes. The chief modifications are the inclusion of some milk and the substitution of bread for a portion of their rice. Vegetables were probably used less, and meat perhaps more than in the reported diets of the middle classes in China.

*Weight of food consumed*

The total weight of fresh food consumed daily by each child and the weight after it was dried, are shown in table 3. The average for each child was computed on the basis of his body weight. The bulk of fresh food eaten daily varied from 1002 to 1948 grams. It was noted that all the children in the same family usually consumed about the same weight of fresh food, regardless of the age of the child. The younger children seemed to prefer more liquid food, such as soup, as shown by the percentage of water in the diets. According to the age of the subjects, there were more individual fluctuations in the weight of the fresh food consumed, and in the liquid portions of it, than in the dried portions. It is interesting to note that the values for both fresh and dried food are greatest for those children whose physical condition and environment were the best.

*Caloric intake*

Table 4 records the energy intake of each child in terms of total calories per 24 hours; and calories per kilogram, per centimeter, and per square meter. It is seen that the values for total calories agreed closely for the two days for 10 of the children, but that they varied considerably for the others. These variations may be attributed to the facts that either more fat was used in cooking on the second day, or that less food was cooked on the first day, since it was Sunday. In general, the average caloric intakes increased with the ages of the children, although there were some marked variations from this trend. The lowest value was 967 for a 5 year old boy, and the highest, 2342 for a 14 year old girl. These variations were somewhat in accord with the physical condition of the children and the economic status of the families. The caloric intakes of the 3 undernourished boys in the C. family were much less than those of other children of the same age, or even younger. The tallest girl, L. F. and the heaviest girl, J. T., as well as the best nourished boys V. F., S. D. and H. T. had the largest intakes.

As shown in chart 1 the total caloric values of the food consumed by the children of this study, especially the girls, are with few exceptions,

TABLE 4

*Caloric intake per twenty-four hours*

| CHILD | HEIGHT | SURFACE AREA | OBSERVED CALORIC INTAKE | | | | | | EXCESS OF CALORIC INTAKE OVER BASAL HEAT PRODUCTION | | PERCENTAGE OF TOTAL CALORIES FROM CEREAL SOURCES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Period I | Period II | Daily average | Average per kilogram | Average per square meter | Average per centimeter | Total | Percentage | |
| **Boys** | | | | | | | | | | | |
| | *cm.* | *sq. m.* | | | | | | | | | |
| E. C. | 94.6 | 0.59 | 700 | 1,233 | 967 | 73.3 | 1,636 | 10.2 | 123 | 14.6 | 21.2 |
| E. E. | 99.7 | 0.67 | 853 | 1,599 | 1,226 | 77.2 | 1,830 | 12.3 | | | 20.0 |
| H. I. | 106.7 | 0.72 | 1,171 | 1,937 | 1,554 | 95.3 | 2,161 | 14.5 | 708 | 83.7 | 22.2 |
| He. I. | 111.8 | 0.77 | 1,527 | 2,048 | 1,788 | 98.2 | 2,310 | 15.0 | 875 | 95.8 | 19.9 |
| W. F. | 115.6 | 0.78 | 1,691 | 1,801 | 1,746 | 94.4 | 2,233 | 15.1 | 718 | 69.8 | 59.7 |
| G. E. | 117.6 | 0.81 | 1,364 | 1,812 | 1,588 | 81.9 | 1,965 | 13.5 | 567 | 55.5 | 30.4 |
| Sh. C. | 118.1 | 0.84 | 1,391 | 1,364 | 1,378 | 66.6 | 1,635 | 11.7 | 381 | 38.2 | 39.4 |
| S. D. | 127.0 | 0.91 | 2,210 | 2,450 | 2,330 | 100.9 | 2,569 | 18.3 | 1,295 | 125.1 | 55.6 |
| V. F. | 137.5 | 1.04 | 2,046 | 2,214 | 2,130 | 79.8 | 2,052 | 15.5 | 850 | 66.4 | 50.4 |
| H. T. | 128.3 | 1.07 | 2,011 | 2,388 | 2,200 | 76.9 | 2,048 | 17.2 | 980 | 80.3 | 37.4 |
| F. E. | 129.5 | 1.01 | 1,756 | 2,127 | 1,942 | 73.3 | 1,919 | 15.0 | 793 | 69.0 | 34.9 |
| St. C. | 137.2 | 1.10 | 1,398 | 1,648 | 1,523 | 51.6 | 1,388 | 11.1 | 323 | 26.9 | 52.3 |
| Average | | | 1,509 | 1,885 | 1,698 | 80.8 | 1,979 | 14.5 | 692 | 65.9 | 37.0 |
| **Girls** | | | | | | | | | | | |
| M. Y. | 102.2 | 0.69 | 880 | 1,424 | 1,152 | 71.1 | 1,670 | 11.3 | 232 | 25.2 | 39.7 |
| P. A. | 97.8 | 0.65 | 951 | 1,133 | 1,042 | 69.5 | 1,596 | 10.7 | 224 | 27.4 | 42.6 |
| H. A. | 103.5 | 0.70 | 1,085 | 1,149 | 1,117 | 67.3 | 1,591 | 10.8 | 165 | 17.3 | 49.2 |
| J. E. | 108.6 | 0.75 | | 1,462 | 1,462 | 80.8 | 1,962 | 13.5 | 453 | 44.9 | 22.0 |
| G. M. | 121.9 | 0.84 | 1,606 | 1,667 | 1,637 | 78.7 | 1,949 | 13.4 | 633 | 63.0 | 56.4 |
| E. L. | 125.1 | 0.90 | 1,331 | 1,837 | 1,584 | 68.3 | 1,754 | 12.7 | 528 | 50.0 | 45.8 |
| L. F. | 146.7 | 1.17 | 2,200 | 2,484 | 2,342 | 68.1 | 1,997 | 16.0 | 1,058 | 82.4 | 58.3 |
| T. C. | 132.7 | 1.01 | 1,538 | 2,052 | 1,795 | 65.0 | 1,770 | 13.5 | 781 | 77.0 | 36.5 |
| J. T. | 136.5 | 1.18 | 1,492 | 2,911 | 2,202 | 63.6 | 1,869 | 16.1 | 1,040 | 89.5 | 36.5 |
| M.* | 145.4 | 1.45 | 2,227 | 2,173 | 2,200 | 46.8 | 1,521 | 15.1 | 1,006 | 85.4 | 54.4 |
| Average | | | 1,385 | 1,791 | 1,593 | 70.3 | 1,795 | 13.1 | 568 | 53.0 | 43.0 |

* Omitted from average.

less than the values reported by Holt (19) and Hawley (18) for American children of the same age, in some cases as much as 40 per cent less. This is not surprising since these Chinese children were generally smaller than

American children of the same age. On the whole, it was noted that those children whose caloric intakes were farthest below the standard values were those who lived in the Chinese district and who appeared to be either undernourished or stunted in growth.

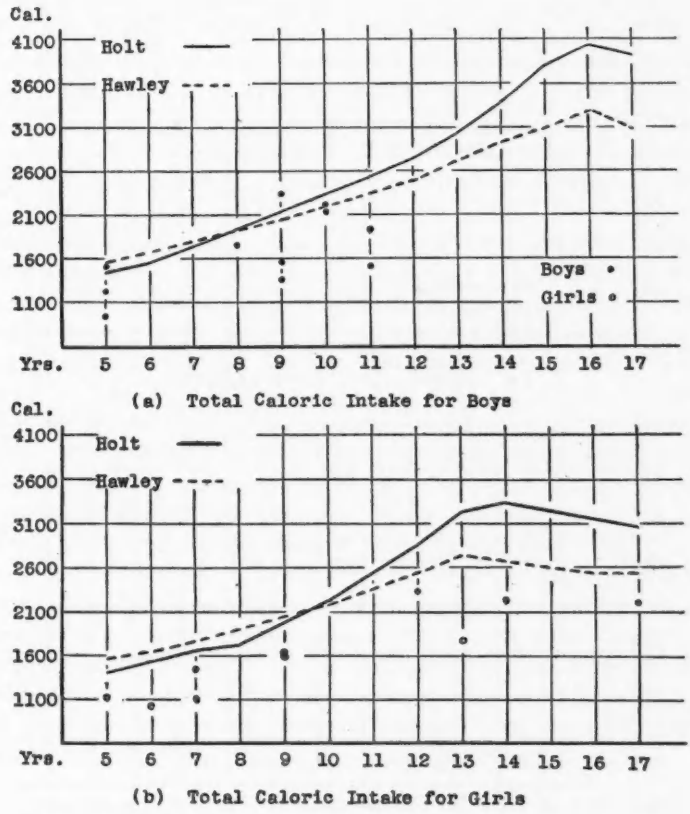


CHART 1. TOTAL CALORIC INTAKES OF CHILDREN COMPARED WITH STANDARDS

On the per kilogram basis, the caloric intakes decreased with the ages of the subjects. These values, moreover, are nearer to the American standards than those for total calories, the average value for the group being slightly above the standard, and figures for few children varying from it more than 20 per cent (chart 2).

The caloric intakes per square meter varied widely with the ages.

This variation does not support Rübner's (28) claim that the caloric intake calculated on the basis of body surface remains comparatively constant, irrespective of age.

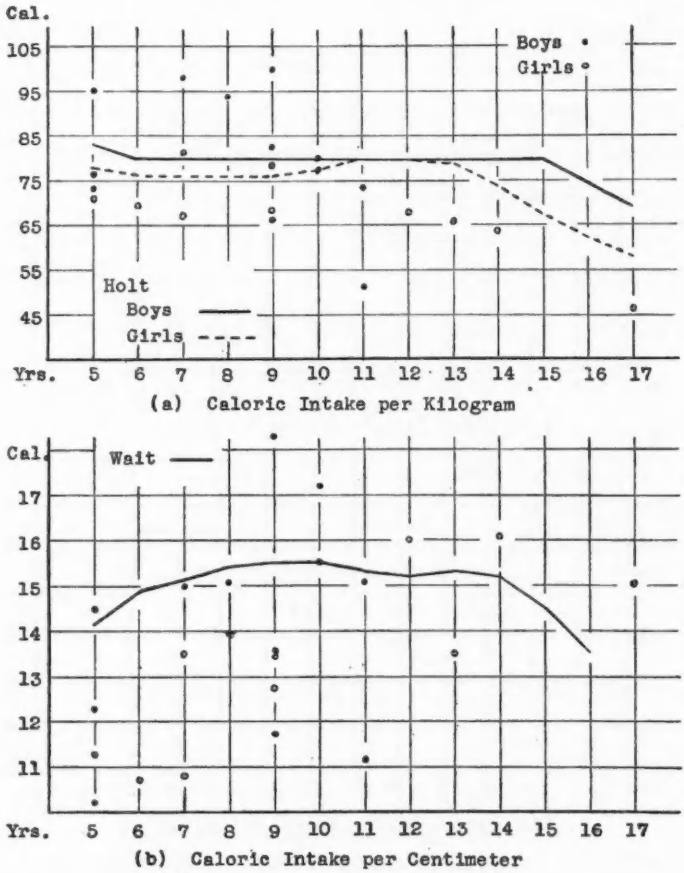


CHART 2. CALORIC INTAKES OF CHILDREN PER KILOGRAM AND PER CENTIMETER COMPARED WITH STANDARDS

When calculated per centimeter of height, the caloric intakes do not show the constancy for all ages which was noted by Wait (39), but range from 10.2 to 18.3. Not only is the variation greater, but the averages are from 10 to 15 per cent lower than Wait's figures (chart 2).

The caloric value of the food consumed by the observed children in excess of their basal heat production, obtained by metabolic determinations, varied from 123 to 1295 or from 14.6 to 125.1 per cent above their basal needs (table 4). According to the assumption of Lusk (22), the approximate total energy requirement of a normal, active child is twice as much as his basal needs. On this basis, the boys S. D., and He. I. were the only children studied who received sufficient calories in their food to supply basal, growth, and activity demands. Lusk also concluded that a quiet child might obtain enough nourishment if his excess calories were only 50 per cent more than his basal needs. The caloric value of the food consumed by 7 children of this study was less than 50 per cent in excess of their basal requirements.

According to the Baldwin-Wood (10) height-weight-age table, children between the ages of 5 and 14 ought to gain from 2 to 5 kgm. each year, and according to Rübner (29), a child should consume 80 calories of food per day in excess of his basal needs, in order to gain 1 kgm. per year. If these conclusions be correct, the observed children needed from 160 to 400 calories of food per day for growth alone. Six of the 7 children previously mentioned received less than 400 calories above their basal requirements. The undernourished boys in the C. family were included in this group of 7 children, and it is probable that they were not receiving sufficient food for all their bodily needs.

The dietary studies reported from China indicate that from 70 to 90 per cent of the caloric value of the diets of the common people are composed of cereals or their products. Sherman (30) estimates that American children derive about 38 per cent of their total calories from cereal sources. The average cereal consumption of the Chinese children of this study was approximately 40 per cent of their total calories (table 4). The individual percentages, however, ranged from 20 to 60. Seven children had over 50 per cent and 5 less than 30 per cent.

### *Protein intake*

Table 5 shows the protein consumed by each child. Although there was a slight tendency for the total protein consumption to increase with the ages of the subjects, there were wide variations in the daily intakes of children of the same age. The amounts varied from 28.0 to 106.3 grams per day. The intakes of 3 boys exceeded the values used for comparison (chart 3), while the intakes of 10 children, possibly on account of their small size, were more than 20 per cent below the standard.

The protein intakes per kilogram of body weight ranged from 1.89 to

3.80 grams, with an average of 2.99 grams for the boys and 2.55 for the girls. The majority of these values were near Holt's figures (chart 3). All but 2 of the children, moreover, had 2 or more grams of protein, 8

TABLE 5

*Protein intake per twenty-four hours*

| CHILD | OBSERVED PROTEIN INTAKE | | | | PERCENTAGE OF TOTAL CALORIES DERIVED FROM PROTEIN SOURCES | PERCENTAGE OF TOTAL PROTEIN DERIVED FROM ANIMAL SOURCES |
|---|---|---|---|---|---|---|
| | Period I | Period II | Daily average | Average per kilogram | | |
| **Boys** | | | | | | |
| | *grams* | *grams* | *grams* | *grams* | | |
| E. C. | 28.0 | 50.4 | 39.2 | 2.97 | 16.2 | 74.2 |
| E. E. | 37.8 | 59.5 | 48.7 | 3.06 | 15.9 | 71.5 |
| H. I. | 30.7 | 63.7 | 47.2 | 2.89 | 12.1 | 70.3 |
| He. I. | 49.7 | 67.0 | 58.4 | 3.21 | 13.1 | 76.5 |
| W. F. | 64.8 | 59.3 | 62.1 | 3.36 | 14.2 | 50.2 |
| G. E. | 57.7 | 65.1 | 61.4 | 3.16 | 15.5 | 34.5 |
| Sh. C. | 43.7 | 57.0 | 50.4 | 2.43 | 14.6 | 33.9 |
| S. D. | 96.7 | 78.7 | 87.7 | 3.80 | 15.1 | 50.6 |
| V. F. | 89.2 | 79.9 | 84.6 | 3.13 | 15.9 | 57.2 |
| H. T. | 83.5 | 86.6 | 85.1 | 2.98 | 15.5 | 69.8 |
| F. E. | 64.6 | 84.7 | 74.7 | 2.82 | 15.4 | 70.6 |
| St. C. | 39.9 | 71.4 | 55.7 | 1.89 | 15.0 | 65.4 |
| Average | 57.2 | 68.6 | 62.9 | 2.99 | 14.9 | 60.4 |
| **Girls** | | | | | | |
| M. Y. | 33.1 | 49.7 | 41.4 | 2.56 | 14.4 | 47.8 |
| P. A. | 31.5 | 39.5 | 35.5 | 2.37 | 13.6 | 64.2 |
| H. A. | 30.5 | 40.1 | 35.3 | 2.13 | 12.6 | 50.7 |
| J. E. | | 56.9 | 56.9 | 3.14 | 15.6 | 75.0 |
| G. M. | 73.8 | 52.7 | 63.3 | 3.04 | 15.5 | 52.3 |
| E. L. | 49.2 | 59.7 | 54.5 | 2.35 | 13.8 | 42.4 |
| L. F. | 97.2 | 79.1 | 88.2 | 2.56 | 15.1 | 50.8 |
| T. C. | 48.2 | 90.1 | 69.1 | 2.50 | 15.4 | 73.3 |
| J. T. | 53.5 | 106.3 | 79.9 | 2.31 | 14.5 | 46.1 |
| M.* | 102.2 | 77.9 | 90.1 | 1.92 | 16.4 | 46.7 |
| Average | 49.0 | 63.8 | 58.2 | 2.55 | 14.5 | 55.8 |

* Omitted from average.

having as much as 3 grams, the allowance which some authorities deem adequate for growth. It is true that Parsons (27) established nitrogen equilibrium in healthy children on 1.1 grams per kilogram; but Wang, Hawks and Kaucher (41) showed that better growth resulted on 4.0

than on 2.0 grams of protein. Therefore, the Chinese children of this study were receiving more than the minimum, if not the optimum, amount of protein recommended by those authors.

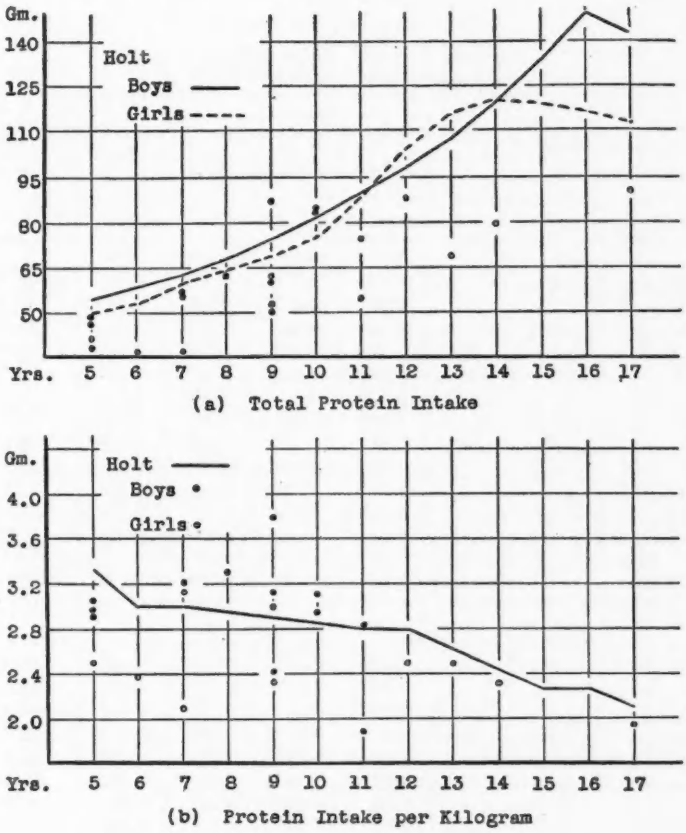


CHART 3. PROTEIN INTAKES OF CHILDREN COMPARED WITH STANDARDS

It is significant that the children with the lowest protein intakes also had the lowest caloric intakes. The protein in the observed diets comprised from 12.1 to 16.4 per cent of the total caloric intakes. This proportion corresponds closely to the 10 to 15 per cent recommended by Sherman (30). Since the caloric intakes of some of the children were probably insufficient, a part of the protein may have been used for energy.

Table 5 shows that the proportion of total protein derived from animal sources ranged from 33.9 to 76.5 per cent, the averages being 60.4 and 55.8 for the boys and girls respectively. Although these averages are

TABLE 6

*Calcium intake per twenty-four hours*

| CHILD | OBSERVED CALCIUM INTAKE | | | | PERCENTAGE OF TOTAL CALCIUM DERIVED FROM MILK |
|---|---|---|---|---|---|
| | Period I | Period II | Daily average | Average per kilogram | |
| **Boys** | | | | | |
| | *grams* | *grams* | *grams* | *grams* | |
| E. C. | 0.370 | 0.581 | 0.475 | 0.035 | 46.3 |
| E. E. | 0.805 | 0.709 | 0.758 | 0.047 | 46.8 |
| H. I. | 0.556 | 0.928 | 0.742 | 0.045 | 59.1 |
| He. I. | 1.014 | 0.998 | 1.006 | 0.055 | 68.7 |
| W. F. | 0.230 | 0.424 | 0.327 | 0.018 | 31.5 |
| G. E. | 0.400 | 0.932 | 0.666 | 0.034 | 37.4 |
| Sh. C. | 0.528 | 0.499 | 0.514 | 0.024 | 40.1 |
| S. D. | 0.492 | 0.675 | 0.583 | 0.025 | 46.8 |
| V. F. | 0.454 | 0.663 | 0.559 | 0.021 | 46.5 |
| H. T. | 0.383 | 1.240 | 0.811 | 0.029 | 27.1 |
| F. E. | 0.364 | 1.084 | 0.724 | 0.027 | 25.7 |
| St. C. | 0.369 | 0.642 | 0.506 | 0.017 | 47.2 |
| Average | 0.497 | 0.781 | 0.639 | 0.031 | 43.6 |
| **Girls** | | | | | |
| M. Y. | 0.398 | 0.887 | 0.642 | 0.040 | 60.3 |
| P. A. | 0.874 | 0.912 | 0.893 | 0.059 | 87.8 |
| H. A. | 0.724 | 0.871 | 0.797 | 0.047 | 64.0 |
| J. E. | | 0.807 | 0.807 | 0.044 | 12.5 |
| G. M. | 0.396 | 0.399 | 0.397 | 0.019 | 45.3 |
| E. L. | 0.506 | 0.982 | 0.745 | 0.032 | 57.4 |
| L. F. | 0.333 | 0.780 | 0.556 | 0.017 | 45.1 |
| T. C. | 0.721 | 1.288 | 1.004 | 0.036 | 46.7 |
| J. T. | 0.239 | 1.447 | 0.842 | 0.024 | 13.9 |
| M.* | 0.508 | 0.511 | 0.510 | 0.011 | 40.2 |
| Average | 0.508 | 0.911 | 0.743 | 0.035 | 48.1 |

* Omitted from average.

between Holt's (19) maximum and minimum recommendations of 66 and 50 per cent, 6 children had less than the minimum and 7 more than the maximum. It may be noted that even the children who were receiving

the smallest proportion of animal protein had nearly three times as much as that reported in a typical Chinese diet among the poorer classes, which was only from 5 to 10 per cent of the total protein intake.

TABLE 7

*Phosphorus intake per twenty-four hours*

| CHILD | OBSERVED PHOSPHORUS INTAKE | | | | RATIO P/Ca |
|---|---|---|---|---|---|
| | Period I | Period II | Daily average | Average per kilogram | |
| | | | Boys | | |
| | *grams* | *grams* | *grams* | *grams* | |
| E. C. | 0.484 | 0.838 | 0.661 | 0.050 | 1:1.39 |
| E. E. | 0.768 | 0.932 | 0.850 | 0.054 | 1:1.12 |
| H. I. | 0.658 | 1.227 | 0.942 | 0.058 | 1:1.27 |
| He. I. | 1.061 | 1.260 | 1.161 | 0.064 | 1:1.15 |
| W. F. | 0.765 | 0.784 | 0.774 | 0.042 | 1:2.37 |
| G. E. | 0.737 | 1.073 | 0.905 | 0.047 | 1:1.36 |
| Sh. C. | 0.722 | 0.891 | 0.807 | 0.039 | 1:1.57 |
| S. D. | 1.244 | 1.086 | 1.165 | 0.050 | 1:2.00 |
| V. F. | 1.153 | 1.087 | 1.120 | 0.042 | 1:2.00 |
| H. T. | 0.957 | 1.512 | 1.239 | 0.043 | 1:1.53 |
| F. E. | 0.835 | 1.286 | 1.060 | 0.040 | 1:1.46 |
| St. C. | 0.570 | 1.085 | 0.828 | 0.028 | 1:1.64 |
| Average | 0.830 | 1.088 | 0.959 | 0.046 | 1:1.57 |
| | | | Girls | | |
| M. Y. | 0.524 | 0.935 | 0.730 | 0.045 | 1:1.14 |
| P. A. | 0.765 | 0.871 | 0.818 | 0.055 | 1:0.92 |
| H. A. | 0.654 | 0.881 | 0.767 | 0.046 | 1:0.96 |
| J. E. | | 0.934 | 0.934 | 0.052 | 1:1.16 |
| G. M. | 0.964 | 0.708 | 0.836 | 0.040 | 1:2.11 |
| E. L. | 0.713 | 1.067 | 0.890 | 0.038 | 1:1.19 |
| L. F. | 1.138 | 1.199 | 1.168 | 0.034 | 1:2.10 |
| T. C. | 0.867 | 1.444 | 1.156 | 0.038 | 1:1.15 |
| J. T. | 0.767 | 1.768 | 1.267 | 0.037 | 1:1.50 |
| M.* | 1.285 | 0.947 | 1.116 | 0.024 | 1:2.19 |
| Average | 0.799 | 0.979 | 0.952 | 0.043 | 1:1.36 |

* Omitted from average.

### *Calcium and phosphorus intakes*

The calcium intakes of these 22 children ranged from 0.230 to 1.447 grams, with averages of 0.639 and 0.743 gram for the boys and girls respectively (table 6). Only 2 children had an average intake of 1.0

gram, the allowance proposed by Sherman and Hawley (31), although the intakes of 4 others closely approached that amount. The majority of the values were between 0.5 and 0.8 of a gram. Nine children had less than 0.6 of a gram, the amount which produced a negative balance in the children on the low calcium diet reported by Courtney and Brown (14). With one exception, every child in the study had a higher calcium intake than the 0.337 gram which Wu and Wu (41) estimated as the average daily calcium intake in diets used in China.

Based on kilograms of body weight, the average calcium intake of the group was approximately equal to Sherman's estimated requirement. The intakes of 8 children fell below his standard from 10 to 54 per cent, while the intakes of 6 exceeded it by 20 or more per cent. The values for 6 children were lower even than the minimum requirement of 0.023 gram established by Wang and her associates (42). The low calcium content of some of the diets was undoubtedly due to the fact that they contained so little milk.

The average daily phosphorus intake of each child, as tabulated in table 7, ranged from 0.661 to 1.267, no individual intake being so much as 1.32 grams, the requirement given by Sherman (30). The average amount observed was a little lower than the average of 1.178 grams calculated by Wu and Wu (49) from the Chinese diets. Although, when expressed per kilogram, the phosphorus intakes ranged from 0.028 to 0.064 gram, they did not show such wide variations from Sherman's standard as did the calcium intakes, half of the children having had more than his requirement. With two exceptions, all of the intakes exceeded the minimum requirement of 0.034 gram given by Wang, Kern and Kaucher (42).

The average of the calcium to phoshorus ratios as shown in table 7 is 1:1.4. This is practically the same as the ratios calculated from the values for calcium and phosphorus as given by Sherman and also by Wang and her associates, and above the ratio calculated from the calcium and phosphorus in the normal diet given by Orr and his co-workers (26), but lower than 1:3.5, the ratio given by Wu and Wu.

## SUMMARY

An individual dietary study was conducted in the homes of 22 Chinese American children living in Chicago. All food was analyzed for calories, protein, calcium and phosphorus.

1. Chinese methods of preparing and cooking food were used in most cases, although there was evidence of the effect of American customs.

The average daily consumption of rice was 276 grams; other cereals, 93.5 grams; vegetables, 133 grams; fruit, 121 grams; milk, 268 grams; butter, 8 grams; meat, 152 grams; eggs, 35 grams.

2. The daily total caloric value of the food consumed varied from 967 to 2342, the average amounts being from 12 to 28 per cent below the values given by various authors for children of the same age. On the per kilogram basis, the calories approximated the accepted American standards. Seven of the children had caloric intakes less than 50 per cent above their basal requirements. About 40 per cent of the total calories were derived from cereal sources.

3. The total protein in the diets varied from 35.3 to 90.1 grams, while the values per kilogram varied from 1.89 to 3.80 grams. From 33.9 to 76.5 per cent of this protein was derived from animal sources, the average amount being about 58 per cent.

4. The total calcium intakes varied from 0.327 to 1.006 grams, and the values per kilogram varied from 0.011 to 0.059 gram.

5. The total phosphorus intakes ranged from 0.661 to 1.267 grams, and on the per kilogram basis from 0.024 to 0.064 gram.

6. The calcium to phosphorus ratios averaged 1:1.4.

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# NEUTRAL DIET IN TREATMENT OF NEPHRITIC EDEMA[1,2]

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For many years the treatment of nephritic edema has consisted of a low protein diet and restriction of both sodium chloride and water. This treatment was based on the assumption that the kidneys, being damaged by the disease, could not excrete chloride and water. These substances would consequently be retained in the body and manifest their presence clinically as edema, or dropsy. No satisfactory scientific work has been done to substantiate this reasoning.

On the contrary, one might assume that the reason for the retention of sodium chloride and water was that the tissues retain these substances. They would therefore not be presented to the kidneys for excretion. If this extra-renal cause for edema be the true one, the rational treatment will consist of attempting to release these substances from the cells rather than attempting to improve their elimination by way of the kidneys. This report deals with evidence which supports the latter view (2).

It is an old clinical observation that patients in acidosis are usually dehydrated. It occurred to us that perhaps in nephritic edema we could release the water from the tissues by giving acid. This would assume of course that the "injured kidneys" could excrete the water when released. In chart 1, the diet throughout the period was the standard low-protein, "salt-poor" type of diet. For the first eleven days (arrow *A*) there was no gain in edema whether fluid intake was maintained below 1500 cc. daily, or above 4000 cc. daily. Beginning at arrow *A*, chloride in the form of sodium chloride was given (15 grams NaCl daily) in addition to the diet. The edema rapidly increased, whether fluid intake was maintained above 4000 cc. daily, or below 1500 cc. daily. At arrow *B*, the form of chloride was changed from sodium chloride to hydrochloric acid (165 cc. N/10 HCl daily). Then the edema promptly decreased, whether fluid intake was maintained above 4000 cc. or below 1500 cc. daily.

Several points are obvious. First, the degree of the edema did not in-

[1] Presented before the American Dietetic Association, Cincinnati, October 20, 1931.

[2] For more detailed account of data *see* Jour. Amer. Med. Assn. 97: 918 (Sept. 26) 1931.

crease with increase of fluid intake. The kidneys had no difficulty in excreting water. Second, chloride in the form of sodium chloride increased the edema, but as hydrochloric acid decreased the edema. Third, one might suspect that the alkaline sodium ion, rather than the chloride ion, might be responsible for the edema. Various investigators have shown a definite relationship between sodium retention and edema.

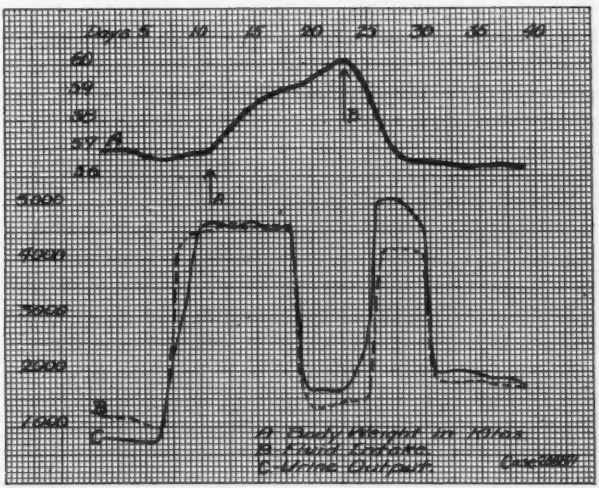

CHART 1

If alkali is important in producing edema, then it becomes important to restrict alkali intake from every source. The standard low-protein, salt-free, nephritic diet is decidedly alkaline. The average diet as served in a hospital may have an alkaline excess of 250 to 750 cc. N/10 NaOH. The importance of taking the reaction of the diet into account is illustrated in chart 2.

In chart 2, for the first forty days (arrow *A*) the diet was of low-protein, "salt-poor" type. The total ash content was 7 to 8 grams daily, but the ash was decidedly basic, (equivalent to 185 cc. N/10 alkali). In spite of restricted fluid intake, below 1500 cc. daily, there was a gradual gain in edema. At arrow A, chloride in the form of hydrochloric acid was given in amounts just sufficient to neutralize the excess base of the diet (185 cc. N/10 HCl). Thus the total ash intake became neutral in

reaction. For the next sixteen days there was neither gain nor loss of edema, whether fluid intake was maintained above 4000 cc. daily, or below 1500 cc. daily. Beginning at arrow *B*, the diet was so changed that the ash was neutral in reaction instead of basic, but the total amount of ash remained the same (7 to 8 grams). The hydrochloric acid was increased 15 cc. daily (200 cc. N/10 HCl). Now the total ash intake became acid in reaction. The edema then gradually decreased regardless of an average daily fluid intake of 2200 cc. It is obvious again that the reaction of the total ash intake is much more important than its amount, the total amount of fluid intake, or the chlorides as such.

The procedure shown in these two charts has been repeated over and over again with the same results.

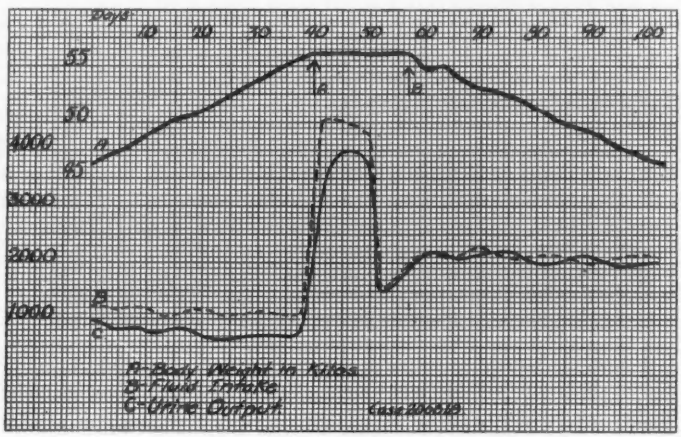


CHART 2

We have concluded that: (1) Edema is not due to the failure of the kidneys to excrete water, and is independent of the fluid intake. (2) Edema is not due to the failure of the kidneys to excrete chlorides. Chloride as sodium chloride increases edema, but as hydrochloric acid or ammonium chloride decreases edema. (3) The reaction of the total ash intake is more important than the total amount of ash. Alkaline ash intake increases edema and acid ash intake decreases edema.

Based upon these conclusions the following treatment of nephritic edema has been designed:

*1. Diet.* (*a*) *Protein content.* The relationship of low plasma proteins to edema has been demonstrated repeatedly. Some have reported

good results by feeding a higher protein diet than is ordinarily used. But, awaiting further investigation, we have adhered to a protein content of about 50 grams daily.

(*b*) *Ash content.* We have not been concerned so much with the total ash content of the diet as with its reaction. The ideal diet would be one in which the acid portion exceeded the basic. However, it is difficult to make an acid diet with low protein content and keep it palatable. We have therefore adopted a diet with a neutral ash. The quality and content have been varied to make it liquid, soft, or general, in order to meet the condition of the patient.

*2. Ammonium chloride.* We have adopted the use of the "acid producing" salt, ammonium chloride, in preference to hydrochloric acid. Much more available acid can be given this way than as hydrochloric acid. From 10 to 15 grams daily are used. It is best given in three doses of several 0.5 gram capsules with the meals. The stomach seems to tolerate it better in this way.

*3. Fluid intake.* Instead of fluids being restricted, they are forced to 5000 cc. or more daily, regardless of the amount of the edema. No difficulty in eliminating these amounts has been encountered. It has been known for a long time that diseased kidneys cannot "concentrate urine." Therefore, it would seem to be illogical under the circumstances to restrict fluids, since restriction would result in the patient being unable to eliminate all the waste products. Furthermore, forcing fluids should be indicated, especially since fluid intake does not influence edema, and since the kidneys have no difficulty in eliminating fluid. For two years this procedure has been employed with very gratifying results.

The excellent coöperation of Miss Gladys Enke of the Dietetic Department, in designing and preparing various types of neutral diets, has made this treatment practical.

# THE NEUTRAL DIET

GLADYS ENKE

*University Hospital, Ann Arbor, Michigan*

The principles underlying the use of a neutral diet in nephritis with edema have been discussed by Dr. Lashmet (1) and (2). The diet as presented here has been developed in connection with these studies. It conforms to the usual standards for nephritic feeding, and in addition makes use of the fact that most foods yield an ash preponderantly either acid or basic. Vegetables and fruits, with their content of calcium, magnesium, sodium, and potassium, are eventually basic in their reactions within the body, while cereals and meats, which contain considerable amounts of sulphur, phosphorous and chlorine, are strongly acid (3). One has difficulty in calculating the acid and base values of any diet because of the lack of agreement in available tables, Sherman's "Food Products" (4) and the work of Sherman and Gettler (6) being the principal sources of reliable data.

The neutral diet as used in this hospital is a salt-free diet allowing two-thirds gram of protein per kilogram of normal weight, or 45 to 50 grams of protein. It yields approximately 2000 calories, and the excess of basic ash is balanced by the excess of acid. A slight excess of acid is usually planned. The diet has been measured (5) rather than weighed, both in the hospital and in the patient's home.

In calculating our neutral diet we have used the foundation diet (table 1).

All the foods listed in Group A, table 2, are to be incorporated in each day's diet, divided as desired. To this is added one of the foods in Group B, table 2. The total excess acid of Group A plus Group B gives the total excess acid for the day. This is to be balanced with excess base. The amounts of milk and cream noted in Group C are to be included in the diet daily, either in combination with other foods, or as a beverage. The excess base of the milk and cream must be subtracted from the total excess acid of Groups A and B, the result being the amount of excess base one may use for fruits and vegetables. As one may see from tables 3 and 4, this base allowance limits the choice of fruits and

vegetables quite definitely. A number of the staple foods, such as potatoes and leafy vegetables, are so high in base that they can be used only occasionally.

The few fruits and vegetables which have an excess acid such as cranberries, plums, prunes, and corn, may be used to an excellent advantage in the diet. Cornstarch and tapioca are most adaptable as desserts. In order to get successful results the patient must be satisfied and willing to coöperate. With ingenuity in the combination of the foods, very tempting dishes can be made.

TABLE 1

| FOOD | WEIGHT | PROTEINS | FATS | CARBOHYDRATES | CALORIES | EXCESS ACID | EXCESS BASE |
|---|---|---|---|---|---|---|---|
| | *grams* | | | | | | |
| Cereal* (dry weight average) | 20 | 2.1 | 0.67 | 14.2 | 72 | 1.9 | |
| Bread, whole wheat | 90 | 8.7 | 0.8 | 43.6 | 217 | 6.5 | |
| Rice, brown, dry weight† | 30 | 2.4 | 0.09 | 23.6 | 105 | 2.8 | |
| Macaroni, dry weight | 30 | 4.0 | 0.27 | 22.2 | 107 | 2.9 | |
| Butter | 60 | 0.6 | 51.0 | | 461 | | |
| Sugar | 30 | | | 30.0 | 120 | | |
| Tapioca, uncooked | 10 | 0.04 | | 8.7 | 35 | | |
| Cream, 20 per cent | 200 | 5.8 | 40.0 | 8.0 | 416 | | 1.2 |
| Milk | 200 | 6.6 | 8.0 | 10.0 | 138 | | 3.6 |
| Eggs | 2 | 13.4 | 10.4 | | 148 | 11.0 | |
| Vegetable, 5 per cent | 200 | 2.0 | | 10.0 | 48 | | |
| Vegetable, 10 per cent | 100 | 1.0 | | 10.0 | 44 | | |
| Vegetable, 15 per cent | 100 | 1.0 | | 14.0 | 60 | | |
| Totals | | 47.64 | 111.23 | 194.3 | 1,971 | 25.1 | 4.8‡ |

* This represents an average of four cereals (oatmeal, cornmeal, rice, shredded wheat).

† Brown rice is used because of its high iron content.

‡ The base of vegetables and fruits is calculated individually and therefore not included.

This general outline can be modified for patients requiring other than a general neutral diet. Table 6 is an example of a liquid diet yielding a neutral ash.

In like manner, a modification of the general neutral diet may be a soft diet substituting puréed fruits and vegetables and finely divided meats for those ordinarily served. Also it may be made a high or low calorie diet by increasing or decreasing the amounts of butter and sugar, or by the substitution of 40 per cent whipping cream, or milk, for the customary 20 per cent coffee cream.

TABLE 2

*Menu construction based on calculation in table 1*

*Note:* The total excess acid (A + B), must equal or exceed the total excess base (C + D) in the day's diet. The excess acid and base are expressed in cubic centimeters of normal solution.

A. Acid and neutral ash foods to be included in diet daily

| FOOD | GRAMS | APPROXIMATE MEASURE | EXCESS ACID |
|---|---|---|---|
| Cereal, prepared | 20 | ⅔ cup | 1.9 |
| or cereal, uncooked | 20 | | |
| or cereal, cooked | 100 | ½ cup | |
| Bread, whole wheat | 90 | 3 slices | 6.5 |
| Rice, uncooked | 30 | 2 tablespoons | 2.8 |
| or rice, cooked | 100 | ½ cup | |
| Macaroni, uncooked | 30 | ¼ cup | 2.8 |
| or macaroni, cooked | 100 | ⅔ cup | |
| Butter | 60 | 4 tablespoons | Neutral |
| Sugar | 30 | 6 teaspoons | Neutral |
| Tapioca, uncooked | 10 | 1 tablespoon | Neutral |
| or tapioca, cooked | 100 | ⅓ cup | Neutral |
| or cornstarch | 6 | 1 tablespoon | Neutral |
| Total excess acid | | | 14.1 |

B. Select *one* of the following in addition to foods allowed daily under (A)

| FOOD | GRAMS | APPROXIMATE MEASURE | EXCESS ACID | TOTAL EXCESS ACID FOR THE DAY A + B |
|---|---|---|---|---|
| Oysters | 200 | 8 large | 30.4 | 44.5 |
| Eggs | 100 | 2 | 11.0 | 25.1 |
| Beef steak, medium fat | 79 | 3½″ x 3½″ x ½″ | 8.5 | 22.6 |
| Lamb roast | 68 | 3¾″ x 4½″ x ¼″ | 7.3 | 21.4 |
| Beef, round lean | 68 | 3″ x 3½″ x ½″ | 7.2 | 21.3 |
| Lamb chop, E.P. medium fat | 72 | 4¼″ x 2″ x ¾″ | 6.7 | 20.8 |
| Chicken, cooked | 48 | ½ leg or ¼ cup | 6.7 | 20.8 |
| Veal chop, E.P. loin medium fat | 68 | 1 small ⅜″ thick | 6.7 | 20.8 |
| Pork chop, E.P. medium fat | 80 | 4½″ x 2¼″ x ¾″ | 6.6 | 20.7 |
| Fish | 58 | 3″ x 2¼″ x ¾″ | 6.5 | 20.6 |
| Veal roast | 50 | 2″ x 2¾″ x ⅛″ | 6.5 | 20.6 |

C. Basic foods to be included in diet daily

| FOOD | GRAMS | APPROXIMATE MEASURE | EXCESS BASE |
|---|---|---|---|
| Cream, 20 per cent | 200 | 1 cup | 1.2 |
| Milk | 200 | 1 cup | 3.6 |
| Total excess base | | | 4.8 |

D. Add basic foods, fruits and vegetables (*see* tables 3 and 4)

TABLE 3

*Basic* content of fruits (edible portion)*

| FOOD | WEIGHT | APPROXIMATE MEASURE | EXCESS BASE |
|---|---|---|---|
| | *grams* | | |
| Watermelon | 100 | 2½″ x 2½″ x ½″ | 2.7 |
| Grapes | 100 | ½ cup or 24 grapes | 2.7 |
| Pear, fresh | 100 | 1 medium | 3.6 |
| Apple, fresh | 100 | ⅔ medium size or 1 small | 3.7 |
| Grape juice | 100 | ½ cup | 3.9 |
| Lemon juice | 100 | ½ cup | 4.1 |
| Cherry juice | 100 | ½ cup | 4.4 |
| Orange juice | 100 | ½ cup | 4.5 |
| Raspberry juice | 100 | ½ cup | 4.9 |
| Peach, fresh | 100 | 1 medium | 5.0 |
| Lemon | 100 | 1 lemon 2¾″ long | 5.5 |
| Banana | 100 | ¾ cup or ½ large | 5.6 |
| Orange | 100 | Pulp of orange 2½″ diameter | 5.6 |
| Cherries, fresh | 100 | ¾ cup | 6.1 |
| Apricots, fresh | 100 | 2 apricots 1⅝″ diameter | 6.8 |
| Pineapple, fresh | 100 | ⅔ cup diced | 6.8 |
| Muskmelon | 100 | ½ cup pulp or ⅓ of 4½″ melon | 7.5 |
| Rhubarb | 100 | ½ cup cooked | 8.6 |
| Dates | 100 | 14 | 11.0 |
| Raisins | 100 | ¾ cup | 23.7 |

*Plums, prunes and cranberries yield an excess of acid ash. No quantitative data available.

*Note:* Canned foods, 150 grams, including 50 grams liquor, are assumed to be the equivalent of 100 grams fresh fruits or vegetables.

TABLE 4

*Basic content of vegetables (edible portion)**

| FOOD | WEIGHT | APPROXIMATE MEASURE | EXCESS BASE |
|---|---|---|---|
| | *grams* | | |
| Asparagus | 100 | ½ cup cut | 0.8 |
| Green peas, fresh | 100 | ¾ cup | 1.3 |
| Onions | 100 | ½ cup or 3 medium size | 1.5 |
| Pumpkin | 100 | ½ cup cooked | 1.5 |
| Squash | 100 | ½ cup mashed | 2.8 |
| Turnips | 100 | ½ cup cooked | 2.7 |
| Radishes | 100 | 10 radishes 1″ diameter | 2.9 |
| Mushrooms | 100 | ½ cup canned | 4.0 |
| Cauliflower | 100 | ¾ cup cooked | 5.3 |
| String beans, fresh raw | 100 | ¾ cup cut | 5.4 |
| Tomatoes, fresh | 100 | ½ cup cooked or 1 tomato 2½″ diameter | 5.6 |
| Cabbage | 100 | ¾ cup cooked or 1½ cup raw | 6.0 |
| Tomato juice | 100 | ½ cup | 6.2 |
| Sweet potato | 100 | ½ medium size uncooked | 6.7 |
| White potato, raw or steamed | 100 | 1 potato 2½″ diameter | 7.0 |
| Lettuce | 100 | 16 small leaves or ¼ head + 2 leaves | 7.4 |
| Celery | 100 | 4 medium stalks or ¾ cup cut | 7.8 |
| Cucumber | 100 | ½ cup sliced or 3″ x 1¾″ diameter | 7.9 |
| Rutabagas | 100 | ½ cup mashed | 8.5 |
| Beets, fresh | 100 | ¾ cup | 10.9 |
| Carrots | 100 | ⅝ cup cooked | 10.8 |
| Parsnips | 100 | ½ cup | 11.9 |
| Fresh lima beans | 100 | ½ cup | 14.0 |
| Chard | 100 | ½ cup cooked | 15.8 |
| Spinach | 100 | ½ cup cooked | 27.0 |

* Corn, fresh or canned, 100 grams, ⅔ cup, yields an excess acid 1.8.

TABLE 5

*Sample menu*

| | WEIGHT | APPROXIMATE MEASURE |
|---|---|---|
| **Breakfast** | | |
| | *grams* | |
| Apricots, fresh | 50 | 1 apricot 1⅝″ diameter |
| Oatmeal, uncooked | 20 | ¼ cup dry or 4 tablespoons |
| Soft cooked egg | 50 | One |
| Whole wheat toast | 30 | 1 average slice |
| Butter | 10 | 1 teaspoon |
| Milk | 100 | ⅜ cup |
| Cream, 20 per cent | 100 | ½ cup |
| Sugar | 10 | 2 teaspoons |
| Coffee | | |
| **Dinner** | | |
| Creamed brown rice: | | |
| Rice, uncooked | 30 | 2 tablespoons dry |
| Butter | 5 | ½ teaspoon |
| Cream, 20 per cent | 50 | ¼ cup |
| Asparagus, fresh | 100 | 12 stalks 5″ |
| Butter | 5 | ½ teaspoon |
| Lettuce salad: | | |
| Leaf lettuce | 40 | Approximately 6 small leaves |
| Mayonnaise | 10 | 2 teaspoons |
| Whole wheat bread | 30 | 1 average slice |
| Butter | 10 | 1 teaspoon |
| Sugar | 5 | 1 teaspoon |
| Pineapple tapioca: | | |
| Tapioca, uncooked | 10 | 1 tablespoon |
| Cream, 20 per cent | 50 | ¼ cup |
| Pineapple, fresh | 50 | ⅓ cup diced |
| Sugar | 10 | 2 teaspoons |
| Dates | 10 | 1 date |
| Tea | | |
| **Supper** | | |
| Baked macaroni: | | |
| Macaroni, dry | 30 | ¼ cup |
| Milk | 100 | ⅜ cup |
| Grilled tomato | 100 | 1 tomato 2½″ diameter |
| Egg salad: | | |
| Egg | 50 | One |
| Lettuce | 20 | Approximately 3 small leaves |
| Radish roses | 25 | 2 or 3 |
| Mayonnaise | 10 | 2 teaspoons |
| Fresh pear | 50 | ½ medium |
| Whole wheat bread | 30 | 1 average slice |
| Butter | 10 | 1 teaspoon |
| Sugar | 5 | 1 teaspoon |
| Tea | | |

*Note:* The above menu yields a total of excess acid 25.7, excess base 25.7, proteins 50.1, fats 113.14, carbohydrates 196.3, calories 2,005, calcium 0.650, phosphorus 1.000, iron 0.01133, and a satisfactory vitamin content.

TABLE 6

*Liquid diet yielding a neutral ash*

| FOOD | WEIGHT | PROTEINS | FATS | CARBOHYDRATES | CALORIES | EXCESS ACID | EXCESS BASE |
|---|---|---|---|---|---|---|---|
| | *grams* | | | | | | |
| Cream, 20 per cent | 300 | 8.7 | 60.0 | 12.0 | 624 | | 1.8 |
| Cream, 40 per cent | 100 | 2.2 | 40.0 | 3.0 | 381 | | 0.4 |
| Milk | 400 | 13.2 | 16.0 | 20.0 | 276 | | 7.2 |
| Eggs | 3 | 20.1 | 15.6 | | 222 | 16.5 | |
| Fruit juice, grape | 100 | 0.3 | | 17.3 | 70 | | 4.0 |
| Vegetable puree, tomato | 50 | 0.5 | 0.1 | 1.1 | 11 | | 2.8 |
| Sugar | 30 | | | 30.0 | 120 | | |
| Butter | 40 | 0.4 | 34.0 | | 308 | | |
| Cereal (oatmeal, uncooked) | 10 | 1.6 | 0.7 | 6.6 | 39 | 1.2 | |
| Totals | | 47.0 | 166.4 | 90.0 | 2,051 | 17.7 | 16.2 |

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# SOURCES OF NUTRIENTS CHOSEN BY WOMEN DURING PREGNANCY, LACTATION, AND REPRODUCTIVE REST*†

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Since no comparable quantitative data are available and the current dietary management of pregnant and lactating women is largely empiric, the self-selected, weighed food intake of three women during pregnancy, lactation, and the post-lactation period has been studied to determine the percentage distribution or calories derived from each class of nutrients and the percentage distribution of vegetable and animal protein and of calcium and phosphorus from milk, eggs and cheese, meat, fruits, vegetables, and the cereal grains.

It has been demonstrated both clinically and experimentally that throughout the reproductive cycle, energy, proteins, minerals, and vitamins are needed in amounts somewhat increased above those needed during the pregestational period (1–12). Insufficient studies have been made upon the quantitative nutritional requirements for human reproduction and the relative values of various sources and different combinations of foodstuffs.

Rose (13) has shown that the quality of a diet can be judged most readily in terms of the percentage of calories derived from various classes of foodstuffs. Thus milk is valuable as a protective food supplying minerals, vitamins, and proteins of excellent supplementary value; cereals are valuable for energy and protein; vegetables and fruits, for minerals, vitamins, and laxative properties; fleshy foods, for proteins of good quality; and fats and sugars, for energy, flavor, and palatability.

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‡ National Research Council Fellow in Child Development and Parent Training under a grant of the Spelman Fund, 1927–28, National Research Council Fellow in Child Development under a grant of the Spelman Fund, 1929–30.

PROCEDURE

Subjects VI, VII, and VIII, all multiparae, have experienced uneventful pregnancies and parturitions and have produced daily an average of 3134, 2366, and 1419 cc. of milk, respectively, over a period of more than 60 weeks. The women, possessing only moderate means, made the

TABLE 1

*Percentage distribution of calories in the self-selected diets of Subjects VI, VII, and VIII*

| | NUMBER OF DAYS OBSERVED | PER CENT OF TOTAL CALORIES FROM EACH CLASS OF FOODS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Protein | Fat | Carbohydrate | Cereals | Milk | Vegetables and fruits | Fats | Sugar | Eggs, meat, cheese |
| Subject VI: | | | | | | | | | | |
| Pregnancy | 20 | 16 | 39 | 45 | 17 | 25 | 13 | 14 | 13 | 18 |
| Lactation | 67 | 15 | 40 | 45 | 20 | 31 | 15 | 7 | 11 | 16 |
| Subject VII: | | | | | | | | | | |
| Pregnancy | 21 | 16 | 38 | 46 | 28 | 18 | 15 | 17 | 6 | 16 |
| Lactation | 45 | 14 | 33 | 53 | 37 | 27 | 12 | 9 | 6 | 9 |
| Post-lactation | 13 | 12 | 33 | 55 | 45 | 11 | 13 | 11 | 9 | 11 |
| Subject VIII: | | | | | | | | | | |
| Pregnancy | 8 | 13 | 39 | 48 | 26 | 33 | 16 | 12 | 6 | 7 |
| Lactation | 68 | 16 | 40 | 44 | 27 | 38 | 11 | 7 | 7 | 10 |
| Post-lactation | 13 | 16 | 35 | 49 | 27 | 27 | 10 | 7 | 12 | 17 |
| Subject VI | 87 | 15 | 40 | 45 | 19 | 30 | 15 | 8 | 11 | 17 |
| Subject VII | 79 | 15 | 34 | 51 | 36 | 22 | 13 | 12 | 6 | 11 |
| Subject VII | 89 | 16 | 39 | 45 | 27 | 36 | 11 | 7 | 8 | 11 |
| Pregnancy | 49 | 15 | 39 | 46 | 23 | 23 | 14 | 15 | 9 | 16 |
| Lactation | 180 | 15 | 38 | 47 | 27 | 32 | 13 | 8 | 8 | 12 |
| Post-lactation | 26 | 14 | 34 | 52 | 36 | 19 | 11 | 9 | 11 | 14 |
| Family—Moderate income* | | | | | 25 | 25 | 17 | 15 | 10 | 8 |
| Adult—Moderate income* | | | | | 30 | 13 | 15 | 17 | 10 | 15 |
| Adult—Low income* | | | | | 40 | 18 | 12 | 12 | 10 | 8 |

* Rose, M. S., A Laboratory Handbook for Dietetics, The Macmillan Company, New York, 3rd ed., 1929, p. 31.

food purchases for their families of 5 to 7 members and were able to choose what they wanted from a wide variety of foodstuffs in the Detroit markets.

The dietary observation periods, consisting of 3 to 10 consecutive days, occurred at approximately monthly intervals throughout two lactation periods of 60 weeks duration, and the intervening pregnancies for Subjects

VI and VII, and throughout one pregnancy and the subsequent 65 weeks lactation for Subject VIII, with a total of 79 to 89 days observation on each individual. All foods were weighed and prepared according to the

TABLE 2

*Per cent of total calories derived from each class of nutrients in the self-selected diet of Subject VI*

| DATE | WEEK OF REPRODUCTIVE CYCLE | NUMBER OF DAYS OBSERVED | PROTEIN | FAT | CARBOHYDRATE | CEREALS | MILK | VEGETABLES AND FRUITS | FATS | SUGAR | EGGS, MEAT AND CHEESE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Third lactation** | | | | | | | | | | | |
| *1927* | | | | | | | | | | | |
| December | 60 | 10 | 15 | 38 | 47 | 17 | 26 | 16 | 10 | 13 | 18 |
| **Fourth pregnancy** | | | | | | | | | | | |
| *1928* | | | | | | | | | | | |
| March | 20 | 4 | 18 | 39 | 43 | 20 | 31 | 13 | 13 | 7 | 16 |
| May | 26 | 4 | 17 | 41 | 42 | 16 | 27 | 13 | 17 | 11 | 16 |
| June | 30 | 4 | 17 | 39 | 44 | 16 | 28 | 13 | 13 | 11 | 19 |
| July | 34 | 4 | 16 | 38 | 46 | 16 | 20 | 13 | 16 | 14 | 21 |
| August | 38 | 4 | 14 | 35 | 51 | 15 | 21 | 13 | 13 | 21 | 17 |
| **Fourth lactation** | | | | | | | | | | | |
| September | 7 | 4 | 16 | 35 | 49 | 14 | 28 | 15 | 10 | 17 | 16 |
| October | 10 | 6 | 14 | 42 | 44 | 19 | 39 | 13 | 5 | 9 | 15 |
| November | 14 | 5 | 15 | 43 | 42 | 21 | 38 | 15 | 5 | 6 | 15 |
| December | 19 | 7 | 15 | 38 | 47 | 21 | 26 | 19 | 5 | 10 | 19 |
| *1929* | | | | | | | | | | | |
| January | 23 | 6 | 16 | 37 | 47 | 24 | 30 | 15 | 3 | 10 | 18 |
| February | 27 | 4 | 15 | 38 | 47 | 16 | 31 | 14 | 9 | 12 | 18 |
| March | 30 | 5 | 15 | 37 | 48 | 18 | 31 | 15 | 8 | 13 | 15 |
| April | 34 | 6 | 14 | 41 | 45 | 21 | 36 | 14 | 5 | 11 | 13 |
| May | 38 | 4 | 14 | 41 | 45 | 18 | 29 | 14 | 11 | 12 | 18 |
| June | 42 | 4 | 14 | 44 | 42 | 19 | 32 | 15 | 9 | 8 | 17 |
| July | 46 | 2 | 17 | 36 | 47 | 16 | 35 | 19 | 5 | 10 | 15 |
| October | 60 | 4 | 13 | 42 | 45 | 20 | 30 | 14 | 9 | 12 | 15 |
| Daily variations Maximum | | | | | | 37 | 47 | 23 | 18 | 27 | 33 |
| Daily variations Minimum | | | | | | 8 | 12 | 6 | 0 | 3 | 8 |

usual home procedure in such a manner that the amount of each ingredient could be determined by approved methods of calculation (13).

It has been demonstrated and reported in a previous publication (12) that during lactation food consumption is appreciably greater than during

pregnancy and that the post-lactation diet resembles that during pregnancy. During pregnancy the average daily food intakes of Subjects

TABLE 3

*Per cent of total calories derived from each class of nutrients in the self-selected diet of Subject VII*

| DATE | WEEK OF REPRODUCTIVE CYCLE | NUMBER OF DAYS OBSERVED | PROTEIN | FAT | CARBOHYDRATE | CEREALS | MILK | VEGETABLES AND FRUITS | FATS | SUGAR | EGGS, MEAT AND CHEESE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Second lactation** | | | | | | | | | | | |
| *1927* | | | | | | | | | | | |
| October | 50 | 10 | 16 | 36 | 48 | 25 | 37 | 11 | 9 | 9 | 9 |
| **Third pregnancy** | | | | | | | | | | | |
| *1928* | | | | | | | | | | | |
| February | 14 | 4 | 14 | 36 | 50 | 25 | 18 | 15 | 18 | 12 | 12 |
| May | 26 | 5 | 16 | 38 | 46 | 30 | 17 | 14 | 16 | 6 | 17 |
| June | 30 | 4 | 16 | 39 | 45 | 30 | 17 | 14 | 16 | 5 | 18 |
| July | 34 | 4 | 18 | 37 | 45 | 29 | 19 | 13 | 16 | 4 | 19 |
| August | 38 | 4 | 16 | 38 | 46 | 27 | 21 | 17 | 15 | 5 | 15 |
| **Third lactation** | | | | | | | | | | | |
| October | 7 | 4 | 14 | 39 | 47 | 19 | 36 | 15 | 16 | 8 | 6 |
| December | 13 | 4 | 16 | 29 | 55 | 49 | 26 | 9 | 3 | 6 | 7 |
| *1929* | | | | | | | | | | | |
| January | 18 | 3 | 13 | 27 | 60 | 33 | 28 | 16 | 3 | 14 | 6 |
| February | 22 | 4 | 15 | 35 | 50 | 37 | 39 | 7 | 4 | 4 | 9 |
| March | 25 | 4 | 15 | 38 | 47 | 30 | 29 | 13 | 16 | 3 | 9 |
| April | 29 | 5 | 13 | 26 | 61 | 46 | 25 | 14 | 1 | 4 | 10 |
| May | 36 | 4 | 14 | 38 | 48 | 44 | 16 | 8 | 12 | 3 | 17 |
| June | 42 | 4 | 17 | 29 | 54 | 49 | 20 | 8 | 5 | 4 | 14 |
| November | 60 | 3 | 11 | 33 | 56 | 47 | 13 | 11 | 15 | 6 | 8 |
| Daily variations Maximum | | | | | | 70 | 48 | 30 | 21 | 19 | 41 |
| Daily variations Minimum | | | | | | 14 | 11 | 2 | 0 | 0 | 0 |
| **Post-lactation** | | | | | | | | | | | |
| *1930* | | | | | | | | | | | |
| February | 11 | 3 | 11 | 36 | 53 | 42 | 14 | 10 | 14 | 12 | 8 |
| October | 44 | 3* | 12 | 32 | 56 | 49 | 9 | 12 | 11 | 6 | 13 |
| | | 3 | 12 | 34 | 54 | 47 | 13 | 17 | 8 | 6 | 9 |
| | | 3 | 13 | 29 | 58 | 39 | 9 | 15 | 11 | 13 | 13 |

* Nine consecutive days.

VI, VII, and VIII were respectively 3300, 2900, and 2600 calories, with 133, 115, and 90 grams of protein; during lactation the average daily food

intakes were 4200, 4500, and 3800 calories, with 158, 151, and 151 grams of protein. In the post-lactation period, Subject VII took 3750 calories with 110 grams of protein daily; Subject VIII, 2800 calories with 100 grams of protein.

The mean percentage distribution of calories derived from protein, fat, and carbohydrates, and from cereals, milk, vegetables and fruits, fats, sugar, meat, and eggs and cheese, is recorded in table 1. The proportion of calories derived from the different classes of nutrients, namely 15, 48, and 37 from proteins, carbohydrates, and fats respectively (tables 1 to 4), is similar for all three women. These values fall within the limits regarded as satisfactory for human nutrition by Rose (6), who states that ordinarily about 50 per cent of the calories of the diet should be derived from carbohydrate, with starch predominating, and about 35 to 38 per cent from fat, with protein furnishing the remainder. Sherman (14), however, considers adequate an allowance of protein representing 10 per cent of the ingested calories, since such an amount meets the needs of both the full-grown man and the child at the period of most rapid growth, if the diet is of ample fuel value and the protein is of the right kind.

The percentage distribution of calories among six classes of foodstuffs in these self-selected diets is similar to the proportions recommended, although there was a tendency to select milk as a source of calories in preference to fat, sugar, and cereals. The proportions suggested by Rose (13) for an adult with moderate means compare with the mean daily intakes of Subjects VI, VII, and VIII, respectively, as follows: cereals, 30 vs. 19, 36, and 27 per cent; milk, 13 vs. 30, 22, and 36 per cent; vegetables and fruits, 15 vs. 15, 13, and 11 per cent; fats, 17 vs. 8, 12, and 7 per cent; sugar, 10 vs. 11, 6, and 8 per cent; meat, 15 vs. 17, 11, and 11 per cent. On the whole, there is an agreement between the observed and the suggested proportions. Such differences as occur in the type of diets selected by the women indicate the ingestion of a relatively richer share of minerals, vitamins, and proteins of high biological value than Rose suggests.

The proportion of protein calories to carbohydrate and fat calories, i.e., the nutritive ratio, has been studied in relation to milk production in women (15) and in dairy animals (16). The desirability of liberal protein feeding during lactation is indicated by the work of Hoobler (15), Adair (17), and Meigs (2), who found that the most satisfactory nutritive ratios ranged between 1:4 and 1:8, which provides 11 to 20 per cent of the total calories in the form of proteins. The average nutritive ratios

observed in this investigation, during pregnancy, lactation, and post-lactation, varied between 1:5 and 1:7.2, yielding 12 to 16 per cent of the total caloric intake from protein.

TABLE 4

*Per cent of total calories derived from each class of nutrients in the self-selected diet of Subject VIII*

| DATE | WEEK OF REPRODUCTIVE CYCLE | NUMBER OF DAYS OBSERVED | PROTEIN | FAT | CARBOHYDRATE | CEREALS | MILK | VEGETABLES AND FRUITS | FATS | SUGAR | EGGS, MEAT AND CHEESE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Second pregnancy** | | | | | | | | | | | |
| *1928* | | | | | | | | | | | |
| May | 30 | 4 | 15 | 42 | 43 | 27 | 37 | 11 | 11 | 4 | 10 |
| June | 34 | 4 | 13 | 36 | 51 | 25 | 30 | 21 | 12 | 8 | 4 |
| **Second lactation** | | | | | | | | | | | |
| August | 7 | 4 | 17 | 46 | 37 | 18 | 42 | 8 | 11 | 6 | 15 |
| October | 14 | 6 | 14 | 38 | 48 | 27 | 35 | 12 | 7 | 8 | 11 |
| November | 18 | 8 | 16 | 33 | 51 | 29 | 35 | 12 | 4 | 8 | 12 |
| December | 23 | 8 | 16 | 37 | 47 | 39 | 33 | 10 | 4 | 7 | 7 |
| *1929* | | | | | | | | | | | |
| January | 27 | 4 | 15 | 45 | 40 | 22 | 39 | 10 | 13 | 4 | 12 |
| February | 30 | 9 | 14 | 36 | 50 | 37 | 34 | 10 | 4 | 8 | 7 |
| March | 34 | 7 | 16 | 41 | 43 | 31 | 35 | 8 | 9 | 8 | 9 |
| April | 38 | 8 | 17 | 36 | 47 | 23 | 43 | 14 | 5 | 6 | 9 |
| May | 43 | 4 | 15 | 43 | 42 | 14 | 37 | 10 | 12 | 12 | 15 |
| June | 47 | 4 | 17 | 39 | 44 | 32 | 39 | 8 | 7 | 4 | 10 |
| September | 63 | 4 | 16 | 41 | 43 | 16 | 47 | 9 | 8 | 8 | 12 |
| October | 65 | 3 | 17 | 41 | 42 | 19 | 42 | 9 | 8 | 8 | 14 |
| Daily variations Maximum | | | | | | 49 | 51 | 28 | 21 | 20 | 23 |
| Daily variations Minimum | | | | | | 10 | 21 | 2 | 0 | 0 | 0 |
| **Post-lactation** | | | | | | | | | | | |
| *1930* | | | | | | | | | | | |
| January | 13 | 4 | 14 | 34 | 52 | 32 | 30 | 10 | 5 | 13 | 10 |
| September | 45 | 3* | 17 | 35 | 48 | 17 | 24 | 14 | 8 | 14 | 23 |
| | | 3 | 15 | 40 | 45 | 20 | 29 | 11 | 9 | 11 | 20 |
| | | 3 | 17 | 33 | 50 | 37 | 24 | 6 | 8 | 8 | 17 |

* Nine consecutive days.

The increased protein demands during the reproductive cycle may be regarded, in part at least, as expressing the need for definite combinations of the amino acids required for the specific functions of maintenance,

growth, and milk formation. The selection of the protein with regard to its quality, which depends on the adequacy of the constituent amino-acids for the physiological functions in which they will be used, therefore becomes particularly important during pregnancy and lactation.

The women of this investigation derived the greater proportion of their protein intake from animal sources. Subjects VI, VII, and VIII[1] obtained respectively 76, 60, and 66 per cent of their dietary protein from animal sources during pregnancy and lactation (figure 1, tables 5 to 7). In the post-lactation period, animal protein constituted 34 per cent for Subject VII and 72 per cent for Subject VIII. The total intake of dietary protein was distributed approximately as follows: milk, one-third; cereals, one-fourth; meat, one-fifth; eggs and cheese, one-eighth; vegetables and fruits, one-eighth.

Striking and consistent individual variations were expressed in the selection of protein. Subject VIII chose a larger percentage of milk protein than did the others, but little meat protein during pregnancy and lactation; Subject VI selected a larger proportion of meat protein and less cereal protein; Subject VII chose a much larger proportion of cereals than did the other women. During the post-lactation period, cereals constituted 47 per cent of the total protein intake of Subject VII, but this was well supplemented by 26 per cent from dairy products. According to Pearl (18), the average percentage distribution among various classes of foodstuffs of the dietary protein consumed in this country from 1911 to 1917 was as follows: grains, 36; meat, 26; dairy products, 20; poultry and eggs, 7; vegetables, 6; fish, 2; and all other foods, 3. It is not possible to compare his figures with ours throughout, but it is evident that our subjects chose more of dairy products and fruits and vegetables, with less of cereals and meat, than was contained in the average American dietary during the period studied by Pearl.

Investigations on animals indicate that milk, eggs, cheese, meat, especially the glandular organs (19–23), and nuts (15), supply valuable proteins of excellent quality and that the proteins of the cereal grains are less satisfactory when fed alone, while those of the legumes and vegetables are still less efficient (24, 8). Combinations of milk and cereal proteins may support growth as satisfactorily as milk proteins alone. The high value of meat and milk proteins when fed as supplements to cereal proteins is of practical importance in human nutrition. Mitchell and

[1] Because of albuminuria, a reduction in the diet of flesh foods was advised by the family physician to reduce protein intake; however, since the subject took more milk and cereals, the total protein consumption was not appreciably reduced.

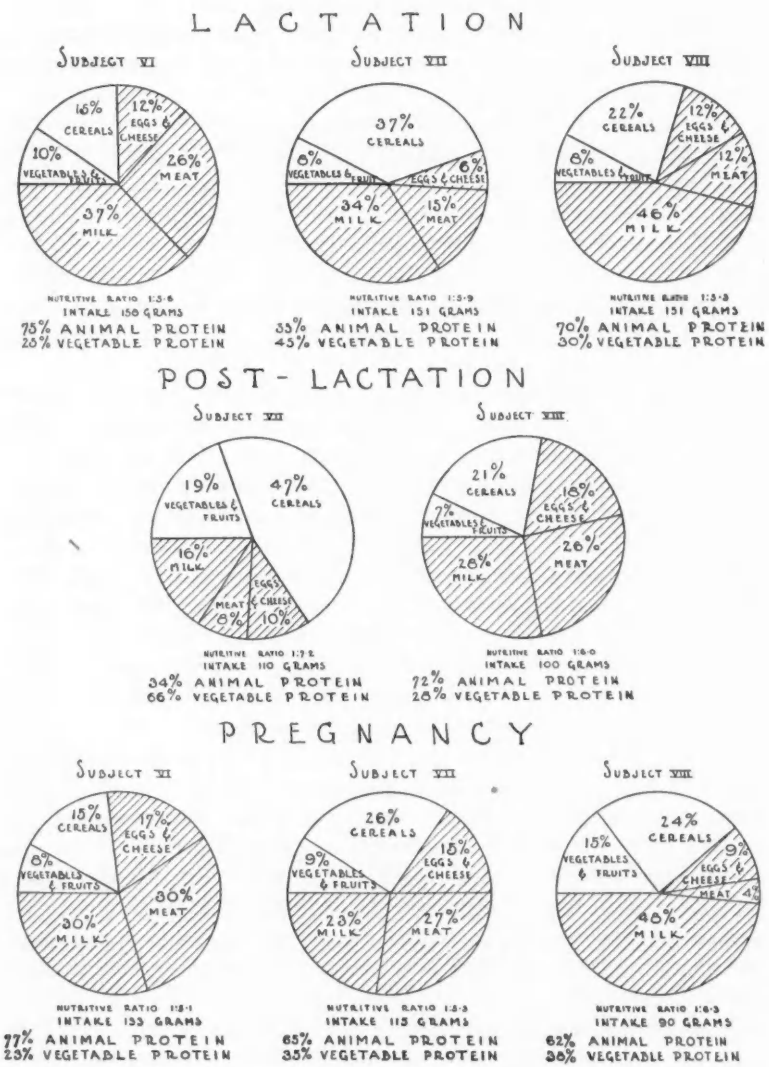


FIG. 1. THE NUTRITIVE RATIO, AND THE AVERAGE DAILY INTAKE AND PERCENTAGE DISTRIBUTION OF ANIMAL AND VEGETABLE PROTEINS FROM MILK, EGGS AND CHEESE, MEAT, CEREALS, AND VEGETABLES AND FRUIT IN THE SELF-CHOSEN DIETS OF SUBJECTS VI, VII, AND VIII DURING PREGNANCY, LACTATION, AND POST-LACTATION

Hamilton (24) state that the value of animal proteins in the American diet appears to reside as much in the extent to which they improve the utilization of inferior cereal proteins as in their own nutritive excellence.

TABLE 5

*Percentage distribution of protein, calcium, and phosphorus in the self-selected diet of Subject VI*

| DATE | WEEK OF REPRODUCTIVE CYCLE | NUMBER OF DAYS OBSERVED | PROTEIN | | | | | | | | CALCIUM | | | | | | PHOSPHORUS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Plant | | | Animal | | | | | | | | | | | | | | | | |
| | | | Vegetables and fruits | Cereals | Total | Eggs and cheese | Meat | Milk | Total | | Fruits | Vegetables | Cereals | Eggs and cheese | Meat | Milk | Fruits | Vegetables | Cereals | Eggs and cheese | Meat | Milk |
| **Third lactation** | | | | | | | | | | | | | | | | | | | | | | |
| *1927* | | | | | | | | | | | | | | | | | | | | | | |
| December | 60 | 10 | | | 20 | 17 | 31 | 32 | 80 | | 4 | 4 | 3 | 9 | 1 | 79 | 3 | 9 | 8 | 10 | 17 | 53 |
| **Fourth pregnancy** | | | | | | | | | | | | | | | | | | | | | | |
| *1928* | | | | | | | | | | | | | | | | | | | | | | |
| March | 20 | 4 | 7 | 16 | 23 | 12 | 31 | 34 | 77 | | 3 | 7 | 4 | 9 | 1 | 76 | 2 | 9 | 13 | 10 | 17 | 49 |
| May | 26 | 4 | 8 | 15 | 23 | 13 | 33 | 31 | 77 | | 3 | 9 | 3 | 9 | 1 | 75 | 2 | 11 | 11 | 11 | 19 | 46 |
| June | 30 | 4 | 8 | 15 | 23 | 20 | 26 | 31 | 77 | | 2 | 7 | 3 | 16 | 1 | 71 | 2 | 10 | 10 | 17 | 16 | 45 |
| July | 34 | 4 | 7 | 15 | 22 | 18 | 37 | 23 | 78 | | 4 | 8 | 3 | 22 | 2 | 61 | 3 | 11 | 11 | 18 | 22 | 35 |
| August | 38 | 4 | 10 | 16 | 26 | 25 | 21 | 28 | 74 | | 2 | 8 | 3 | 27 | 1 | 59 | 2 | 12 | 11 | 23 | 11 | 41 |
| Average | | | 8 | 15 | 23 | 17 | 31 | 29 | 77 | | 3 | 8 | 3 | 16 | 1 | 69 | 2 | 11 | 11 | 16 | 17 | 43 |
| **Fourth lactation** | | | | | | | | | | | | | | | | | | | | | | |
| September | 7 | 4 | 9 | 13 | 22 | 16 | 28 | 34 | 78 | | 3 | 7 | 2 | 16 | 1 | 71 | 3 | 11 | 9 | 15 | 15 | 47 |
| October | 10 | 6 | 10 | 14 | 24 | 10 | 21 | 45 | 76 | | 2 | 5 | 3 | 2 | 1 | 87 | 2 | 11 | 9 | 6 | 10 | 62 |
| November | 14 | 5 | 10 | 14 | 24 | 13 | 22 | 41 | 76 | | 2 | 5 | 2 | 10 | 1 | 80 | 3 | 11 | 5 | 10 | 13 | 58 |
| December | 19 | 7 | 12 | 17 | 29 | 7 | 30 | 34 | 71 | | 4 | 9 | 5 | 4 | 2 | 76 | 3 | 13 | 10 | 7 | 21 | 46 |
| *1929* | | | | | | | | | | | | | | | | | | | | | | |
| January | 23 | 6 | 12 | 17 | 29 | 8 | 32 | 31 | 71 | | 2 | 8 | 6 | 7 | 3 | 74 | 2 | 13 | 8 | 7 | 21 | 49 |
| February | 27 | 4 | 8 | 12 | 20 | 13 | 28 | 39 | 80 | | 2 | 4 | 3 | 13 | 1 | 77 | 2 | 9 | 8 | 13 | 15 | 53 |
| March | 30 | 5 | 9 | 16 | 25 | 8 | 28 | 39 | 75 | | 3 | 6 | 6 | 3 | 1 | 81 | 3 | 11 | 10 | 5 | 17 | 54 |
| April | 34 | 6 | 8 | 17 | 25 | 9 | 25 | 41 | 75 | | 3 | 5 | 7 | 7 | 1 | 77 | 3 | 9 | 12 | 10 | 14 | 52 |
| May | 38 | 4 | 9 | 15 | 24 | 21 | 17 | 38 | 76 | | 3 | 5 | 3 | 11 | 1 | 77 | 3 | 10 | 9 | 16 | 9 | 53 |
| June | 42 | 4 | 10 | 16 | 26 | 10 | 24 | 40 | 74 | | 4 | 4 | 4 | 3 | 1 | 84 | 3 | 9 | 9 | 7 | 14 | 58 |
| July | 46 | 2 | 11 | 13 | 24 | 9 | 31 | 36 | 76 | | 3 | 11 | 6 | 7 | 21 | 52 | 3 | 6 | 2 | 3 | 2 | 84 |
| October | 60 | 4 | 8 | 17 | 25 | 12 | 29 | 34 | 75 | | 7 | .. | 5 | 8 | 1 | 79 | .. | 13 | 10 | 9 | 17 | 51 |
| Average | | | 9 | 15 | 24 | 12 | 26 | 38 | 76 | | 3 | 6 | 4 | 8 | 3 | 76 | 2 | 11 | 8 | 9 | 14 | 56 |

The dietary calcium and phosphorus were largely derived from easily utilizable sources. Milk supplied 69, 56, and 73 per cent of the calcium intake during pregnancy, and 76, 70, and 81 per cent of the intake during

TABLE 6

*Percentage distribution of protein, calcium and phosphorus in the self-selected diet of Subject VII*

| DATE | WEEK OF REPRODUCTIVE CYCLE | NUMBER OF DAYS OBSERVED | PROTEIN | | | | | | | | CALCIUM | | | | | | PHOSPHORUS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Plant | | | Animal | | | | | | | | | | | | | | | | |
| | | | Vegetables and fruits | Cereals | Total | Eggs and cheese | Meat | Milk | Total | | Fruits | Vegetables | Cereals | Eggs and cheese | Meat | Milk | Fruits | Vegetables | Cereals | Eggs and cheese | Meat | Milk |
| **Second lactation** | | | | | | | | | | | | | | | | | | | | | | |
| *1927* | | | | | | | | | | | | | | | | | | | | | | |
| October | 50 | 10 | | | 33 | 6 | 17 | 44 | 67 | | 2 | 4 | 6 | 7 | 1 | 80 | 3 | 8 | 17 | 6 | 9 | 57 |
| **Third pregnancy** | | | | | | | | | | | | | | | | | | | | | | |
| *1928* | | | | | | | | | | | | | | | | | | | | | | |
| February | 14 | 4 | 9 | 27 | 36 | 11 | 27 | 26 | 64 | | 5 | 8 | 8 | 15 | 1 | 63 | 4 | 11 | 23 | 11 | 15 | 36 |
| May | 26 | 5 | 7 | 28 | 35 | 17 | 28 | 20 | 65 | | 5 | 6 | 8 | 30 | 1 | 50 | 3 | 8 | 25 | 19 | 15 | 30 |
| June | 30 | 4 | 8 | 25 | 33 | 16 | 31 | 20 | 67 | | 2 | 8 | 9 | 26 | 1 | 54 | 2 | 11 | 25 | 16 | 17 | 29 |
| July | 34 | 4 | 10 | 27 | 37 | 16 | 22 | 25 | 63 | | 5 | 6 | 8 | 24 | 1 | 56 | 4 | 10 | 24 | 16 | 11 | 35 |
| August | 38 | 4 | 11 | 24 | 35 | 15 | 27 | 23 | 65 | | 3 | 7 | 7 | 27 | 1 | 55 | 3 | 12 | 23 | 16 | 14 | 32 |
| Average | | | 9 | 26 | 35 | 15 | 27 | 23 | 65 | | 4 | 7 | 8 | 24 | 1 | 56 | 3 | 10 | 24 | 16 | 14 | 33 |
| **Third lactation** | | | | | | | | | | | | | | | | | | | | | | |
| October | 7 | 4 | 9 | 20 | 29 | 7 | 13 | 51 | 71 | | 1 | 4 | 4 | 8 | 0 | 83 | 2 | 9 | 14 | 6 | 6 | 63 |
| December | 13 | 4 | 5 | 35 | 40 | 1 | 27 | 32 | 60 | | 2 | 4 | 15 | 0 | 0 | 79 | 2 | 6 | 35 | 0 | 4 | 53 |
| *1929* | | | | | | | | | | | | | | | | | | | | | | |
| January | 18 | 3 | 9 | 34 | 43 | 0 | 13 | 44 | 57 | | 1 | 5 | 11 | 0 | 1 | 82 | 1 | 9 | 33 | 0 | 3 | 54 |
| February | 22 | 4 | 6 | 36 | 42 | 1 | 7 | 50 | 58 | | 1 | 5 | 7 | 3 | 1 | 83 | 2 | 7 | 21 | 4 | 4 | 62 |
| March | 25 | 4 | 7 | 30 | 37 | 11 | 12 | 40 | 63 | | 2 | 5 | 7 | 8 | 0 | 78 | 2 | 9 | 24 | 8 | 6 | 51 |
| April | 29 | 5 | 11 | 47 | 58 | 5 | 8 | 29 | 42 | | 2 | 8 | 10 | 8 | 1 | 71 | 6 | 11 | 25 | 6 | 5 | 47 |
| May | 36 | 4 | 5 | 42 | 47 | 15 | 19 | 19 | 53 | | 2 | 4 | 16 | 27 | 2 | 49 | 1 | 6 | 34 | 18 | 3 | 38 |
| June | 42 | 4 | 7 | 40 | 47 | 10 | 23 | 20 | 53 | | 2 | 6 | 10 | 29 | 0 | 53 | 2 | 8 | 26 | 22 | 8 | 34 |
| November | 60 | 3 | 8 | 53 | 61 | 3 | 16 | 20 | 39 | | 12 | | 25 | 4 | 1 | 58 | 15 | | 41 | 3 | 9 | 32 |
| Average | | | 8 | 37 | 45 | 6 | 15 | 34 | 55 | | 2 | 5 | 12 | 10 | 1 | 70 | 2 | 8 | 28 | 8 | 6 | 48 |
| **Post-lactation** | | | | | | | | | | | | | | | | | | | | | | |
| *1930* | | | | | | | | | | | | | | | | | | | | | | |
| February | 11 | 3 | 9 | 56 | 65 | 5 | 9 | 21 | 35 | | 10 | | 24 | 2 | 1 | 63 | 18 | | 38 | 4 | 7 | 33 |
| October | 44 | 3 | 26 | 48 | 74 | 9 | 4 | 13 | 26 | | 3 | 15 | 12 | 21 | 0 | 49 | 2 | 28 | 29 | 14 | 2 | 25 |
| | | 3 | 15 | 46 | 61 | 9 | 13 | 17 | 39 | | 2 | 13 | 15 | 21 | 1 | 48 | 1 | 20 | 26 | 13 | 7 | 33 |
| | | 3 | 26 | 40 | 66 | 16 | 4 | 14 | 34 | | 3 | 17 | 7 | 33 | 2 | 38 | 3 | 16 | 22 | 22 | 11 | 26 |
| Average | | | 19 | 48 | 67 | 10 | 7 | 16 | 33 | | 2 | 15 | 14 | 19 | 1 | 49 | 2 | 20 | 29 | 13 | 7 | 29 |

lactation, for Subjects VI, VII, and VIII respectively. In the post-lactation period, milk furnished 49 per cent of the intake for Subject

TABLE 7

*Percentage distribution of protein, calcium and phosphorus in the self-selected diet of Subject VIII*

| DATE | WEEK OF REPRODUCTIVE CYCLE | NUMBER OF DAYS OBSERVED | PROTEIN | | | | | | | CALCIUM | | | | | | PHOSPHORUS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Plant | | | Animal | | | | | | | | | | | | | | | |
| | | | Vegetables and fruits | Cereals | Total | Eggs and cheese | Meat | Milk | Total | Fruits | Vegetables | Cereals | Eggs and cheese | Meat | Milk | Fruits | Vegetables | Cereals | Eggs and cheese | Meat | Milk |
| **Second pregnancy** | | | | | | | | | | | | | | | | | | | | | |
| *1928* | | | | | | | | | | | | | | | | | | | | | |
| May | 30 | 4 | 10 | 23 | 33 | 11 | 6 | 50 | 67 | 5 | 0 | 11 | 10 | 1 | 73 | 1 | 10 | 17 | 10 | 4 | 58 |
| June | 34 | 4 | 20 | 25 | 45 | 7 | 2 | 46 | 55 | 7 | 2 | 8 | 10 | 1 | 72 | 1 | 16 | 19 | 8 | 2 | 54 |
| Average | | | 15 | 24 | 39 | 9 | 4 | 48 | 61 | 6 | 1 | 9 | 10 | 1 | 73 | 1 | 13 | 18 | 9 | 3 | 56 |
| **Second lactation** | | | | | | | | | | | | | | | | | | | | | |
| August | 7 | 4 | 6 | 14 | 20 | 16 | 15 | 49 | 80 | 0 | 4 | 2 | 17 | 0 | 77 | 0 | 8 | 8 | 15 | 8 | 61 |
| October | 14 | 6 | 12 | 21 | 33 | 8 | 12 | 47 | 67 | 1 | 6 | 5 | 14 | 0 | 74 | 1 | 14 | 12 | 12 | 3 | 58 |
| November | 18 | 8 | 10 | 28 | 38 | 8 | 13 | 41 | 62 | 0 | 6 | 6 | 10 | 0 | 78 | 0 | 13 | 14 | 10 | 8 | 55 |
| December | 23 | 8 | 7 | 36 | 43 | 4 | 13 | 40 | 57 | 2 | 4 | 11 | 1 | 1 | 81 | 1 | 9 | 19 | 3 | 7 | 61 |
| *1929* | | | | | | | | | | | | | | | | | | | | | |
| January | 27 | 4 | 6 | 17 | 23 | 21 | 5 | 51 | 77 | 0 | 3 | 2 | 11 | 0 | 84 | 1 | 8 | 8 | 16 | 3 | 64 |
| February | 30 | 9 | 10 | 35 | 45 | 3 | 10 | 42 | 55 | 0 | 7 | 9 | 1 | 1 | 82 | 0 | 13 | 18 | 3 | 6 | 60 |
| March | 34 | 7 | 9 | 27 | 36 | 10 | 10 | 44 | 64 | 0 | 4 | 8 | 6 | 1 | 81 | 0 | 7 | 18 | 8 | 4 | 63 |
| April | 38 | 8 | 14 | 19 | 33 | 6 | 13 | 48 | 67 | 1 | 4 | 2 | 4 | 1 | 88 | 0 | 8 | 9 | 5 | 7 | 71 |
| May | 43 | 4 | 9 | 14 | 23 | 21 | 12 | 44 | 77 | 1 | 5 | 3 | 13 | 4 | 74 | 1 | 10 | 11 | 15 | 12 | 51 |
| June | 47 | 4 | 7 | 30 | 37 | 12 | 6 | 45 | 63 | 1 | 3 | 3 | 8 | 0 | 85 | 1 | 5 | 13 | 11 | 4 | 66 |
| September | 63 | 4 | 6 | 14 | 20 | 16 | 10 | 54 | 80 | 0 | 3 | 3 | 4 | 0 | 90 | 0 | 8 | 7 | 10 | 5 | 70 |
| October | 65 | 3 | 5 | 13 | 18 | 11 | 24 | 47 | 82 | 0 | 3 | 2 | 13 | 1 | 81 | 0 | 7 | 8 | 11 | 13 | 61 |
| Average | | | 9 | 22 | 31 | 11 | 12 | 46 | 69 | 1 | 4 | 5 | 8 | 1 | 81 | 0 | 9 | 12 | 10 | 7 | 62 |
| **Post-lactation** | | | | | | | | | | | | | | | | | | | | | |
| *1930* | | | | | | | | | | | | | | | | | | | | | |
| January | 13 | 4 | 9 | 25 | 34 | 10 | 20 | 36 | 66 | 0 | 4 | 4 | 10 | 1 | 81 | 16 | 13 | 11 | 7 | 53 | |
| September | 45 | 3 | 9 | 14 | 23 | 21 | 30 | 26 | 77 | 0 | 9 | 4 | 19 | 1 | 67 | 0 | 21 | 7 | 18 | 15 | 39 |
| | | 3 | 8 | 20 | 28 | 28 | 17 | 27 | 72 | 1 | 6 | 3 | 33 | 1 | 56 | 4 | 10 | 10 | 29 | 7 | 40 |
| | | 3 | 4 | 24 | 28 | 15 | 36 | 21 | 72 | 0 | 6 | 5 | 22 | 1 | 66 | 0 | 7 | 12 | 18 | 17 | 46 |
| Average | | | 7 | 21 | 28 | 18 | 26 | 28 | 72 | 0 | 6 | 4 | 21 | 1 | 68 | 2 | 13 | 10 | 19 | 11 | 45 |

VII and 68 per cent for Subject VIII (figure 2, tables 5 to 7). During the entire reproductive cycle, eggs and cheese were the second highest sources

of calcium, supplying 8 to 24 per cent of the total; cereals and vegetables on the whole supplied less than 10 per cent of the calcium of the diet, while meats and fruits furnished insignificant amounts.

Milk supplied 43, 33, and 56 per cent of the total phosphorus intake in pregnancy, and 56, 48, and 62 per cent in lactation, for Subjects VI, VII, and VIII respectively. In post-lactation, 29 and 45 per cent of the total phosphorus intake came from milk. The following sources furnished

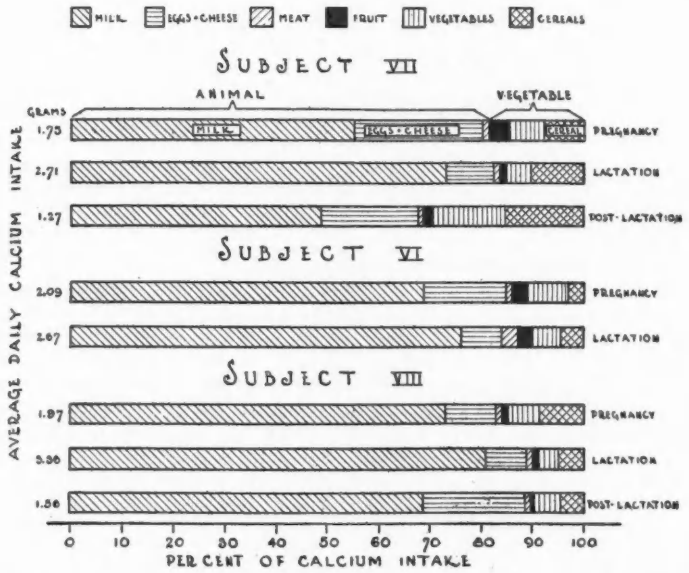


FIG. 2. THE AVERAGE DAILY INTAKE AND PERCENTAGE DISTRIBUTION OF CALCIUM FROM MILK, EGGS AND CHEESE, MEAT, FRUITS, VEGETABLES, AND CEREALS IN THE SELF-CHOSEN DIETS OF SUBJECTS VI, VII, AND VIII DURING PREGNANCY, LACTATION, AND POST-LACTATION

approximately equal proportions of the total phosphorus intake: meat, 3 to 17 per cent; cereals, 8 to 29 per cent; vegetables, 8 to 21 per cent; eggs and cheese, 8 to 19 per cent.

The individual preferences for certain classes of foods are again shown in the choice of calcium and phosphorus. In the diet of Subject VII, cereals were more prominent than in the regimens of Subjects VI and VIII, whereas milk made the greatest contribution of calcium and phosphorus to the diet of Subject VIII.

Liberal quantities of calcium and phosphorus (1.8 to 2.1 grams of calcium and 1.7 to 2.6 grams of phosphorus) were ingested by all three subjects during pregnancy and this intake was increased (2.7 to 3.4 grams of calcium and 3.1 to 3.4 grams of phosphorus) during lactation. In spite of the large quantities of minerals consumed daily by these women it was found that Subject VI, who was storing calcium at the 20th, 34th, and 38th weeks of pregnancy, was in a negative calcium balance at the 26th and 30th weeks of gestation; Subject VII was storing

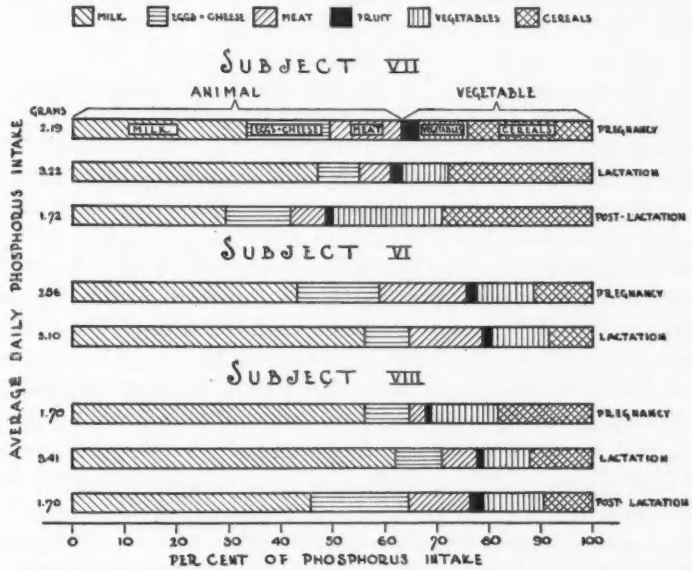


FIG. 3. THE AVERAGE DAILY INTAKE AND PERCENTAGE DISTRIBUTION OF PHOSPHORUS FROM MILK, EGGS AND CHEESE, MEAT, FRUIT, VEGETABLES, AND CEREALS IN THE SELF-CHOSEN DIETS OF SUBJECTS VI, VII, AND VIII DURING PREGNANCY, LACTATION, AND POST-LACTATION

appreciable amounts of calcium at the 14th, 26th, 30th, 34th, and 38th weeks of gestation; and Subject VIII was in negative calcium balance at the 30th and 34th weeks of pregnancy. With one exception (25), all three women were found to be in negative calcium balance at the 7th, 27th, 42nd, and 60th weeks of lactation. The phosphorus balance was positive in the majority of the observation periods. These findings are in agreement with the observations made on cows during heavy lactation. Neither the quantity intakes nor the dietary sources of

calcium and phosphorus were at fault, since these minerals were chiefly derived from the foods from which they are ordinarily considered well utilized (25–29).

Both the food intake and percentages of calories, proteins,. calcium, and phosphorus showed wide daily variations. Thus the percentages of protein derived from eggs and cheese in the food selected by Subject VI on four successive days were 1.0, 0.0, 12.0, and 20.0, while the range of total protein intake was from 117 to 154 grams. The daily percentage of calories derived from cereals varied from 10 to 49, 14 to 70, and 8 to 37 for Subjects VI, VII, and VIII, and those from meat and meat substitutes from 4 to 33, 0 to 41, and 0 to 35. Similar variations occurred in the other dietary constituents. The averages of three or more consecutive days showed considerably less variation than the daily figures did and it appears that each of the subjects showed, in the main, a fairly definite level for each of the nutrients, in spite of the wide range of daily intake. These findings suggest a greater significance in long-continued dietary observations than in those of brief duration.

Certain general characteristics of the diets may be noted. Frequently all of the women omitted eggs and cheese from the daily diet. Subjects VII and VIII also omitted meat frequently. There was a tendency towards using cheese and eggs as meat substitutes. Fruits were uniformly present in the diet of Subject VI, and, although usually included in the food selected by Subject VII, were omitted from the diet of Subject VIII during two-thirds of the observation periods. At least small amounts of green leafy vegetables were usually included in the diets of Subjects VI and VII, but they were present in the diet of Subject VIII during only one-half of the observation periods. Milk, however, served as a protective food, for it was consumed in abundance throughout the reproductive cycle by all three individuals. During lactation the average amount of milk consumed per person per day was 1650 cc., or $1\frac{1}{2}$ quarts. In addition, Subject VI, although untutored, consumed from 100 to 300 grams of cream daily during lactation. This is in accord with the recommendation of Lusk (30) that "The administration of good cream with a substantial mixed diet is highly recommended for nursing mothers."

Although prolonged observations of three women during reproduction do not warrant definite conclusions of typical differences for all women in respect to the choice of food during pregnancy, lactation, and reproductive rest, one finding is especially worthy of comment: in these self-chosen diets of women untrained in dietetics, milk was relatively and absolutely a more important source of energy, protein, calcium, and

phosphorus during lactation than during pregnancy or reproductive rest, a choice in accord with the criteria based upon current knowledge of nutritional principles.

The adequacy of appetite and experience as guides to the self-selection of diet is a question pertinent to this problem of dietary guidance in human reproduction and one concerning which there is much difference of opinion. One of the first attempts to test the innate ability of man to choose a complete diet is reported by Davis (31, 32), who offered complete, natural foods to healthy breast-fed infants from the time of weaning. She observed that "they were able from the first to select their own foods from a list of simple natural ones and in quantities sufficient to maintain themselves in apparently optimal and good nutritional results." In eating they seemed to be governed by caloric needs and individual preferences. Rats and mice (33, 34) and pigs (35) prefer superior foods to inferior foods when allowed free choice between them. On the contrary, Sherman (14) states that "Observation . . . shows that man or other animals when eating varied food under the unrestricted guidance of hunger and appetite tend to take such quantities as are proportional to the energy requirement, whether or not this amount meets also the requirements as to each of the substances known to be necessary in nutrition." As Harrington (36) has observed, appetite may be stimulated by the hunger mechanism; may be the result of habit; may be merely a means of entertainment; or eating may be an outlet for nervous energy. There is a question as to whether appetite is an ideal guide to quantity of food intake. Sherman (14) observes that "Still more often will the individual appetite prove to be an inadequate guide to such a quantitative combination of the different types of food as shall lead to a well-balanced intake of each of the many essential food constituents."

Under the guidance of hunger, appetite, experience, and the desires of themselves and their families, the three subjects of this study chose diets of good quality and liberal quantity. In fact, these diets conformed rather closely to the currently accepted criteria for energy, protein, and minerals.

## SUMMARY

The percentage distribution of calories, protein, calcium, and phosphorus in the self-selected diets of three housewives during pregnancy, lactation, and post-lactation is recorded and discussed. These women are successful in child-bearing and have a marked ability to produce milk.

Although the total food intake was increased approximately 60 per cent in lactation over that of pregnancy, the general quality of the diet was little affected. The distribution of calories was found to conform to recognized dietary principles; animal protein predominated over vegetable protein in the diets during pregnancy and lactation; and dairy products furnished the largest single source of minerals, proteins, and energy.

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# CORRELATION OF COPPER AND MANGANESE CONTENT OF PLANTS AND MINERAL ADDITIONS TO THE SOIL*

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Recent studies concerning the physiological functions of copper and manganese have created a greater interest in these elements as food constituents. Their presence as normal components of soil has long been recognized (1–5), likewise their stimulating effect on growth of plants (6–14). However, our knowledge of the relation between the available copper and manganese content of any single class of vegetables, as reported by Peterson and Lindow (15), may vary by 200 to 300 per cent and there seems to have been no correlation between the type of soil and the manganese content of the plant. Furthermore, discrepancies of similar magnitude for both copper (12–21) and manganese (15, 20–25) content of foodstuffs are to be found in the reports from various laboratories. Therefore we have undertaken a rather limited study of what correlation might exist between the copper and manganese content of spinach and lettuce, and the additions of such minerals to highly fertile soil.

## PROCEDURE

A well-cultivated plot of ground 17 by 40 feet, under Skinner irrigation, was reserved for this experiment. The average pH of this soil was 5.99. This section was divided into 17 plots of equal area, spinach being planted in 11 of them and lettuce in 6. Two of the spinach plots and one of the lettuce served as controls receiving no mineral additions. All the other plots were treated with either $CuSO_4 \cdot 5H_2O$ or $MnSO_4 \cdot 4H_2O$ in quantities similar to those used in numerous soil fertility experiments. This was accomplished by mixing the pulverized salts with dried soil and drilling in the mixture along the rows of plants. Two weeks after the date of planting, such quantities of $CuSO_4 \cdot 5H_2O$ as to be equivalent to 15, 20, 25 or 50 pounds per acre were added to four of the spinach and four of the lettuce plots respectively. To a fifth plot each of spinach

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and lettuce, 20 pounds per acre of copper sulphate were added in four portions at ten-day intervals. The first portion was applied at the same time as the entire amount for the other plots.

Three spinach plots were similarly treated with $MnSO_4 \cdot 4H_2O$ in quantities equivalent to 50, 100, or 150 pounds per acre respectively. To a fourth plot of spinach 100 pounds per acre of the manganese salt were added in 4 portions at ten-day intervals.

When mature, all the plants in each plot were gathered and the roots discarded. After thorough washing to remove all traces of dust and adhering soil, the leaves were dried and pulverized. Care was taken to keep the experimental material out of contact with all metals. Before each analysis the sample was dried to constant weight and all analytical figures calculated on this basis.

*Analytical methods.* For copper, the Biazzo method (26) with the Gebhardt and Sommer modification (27) was used. However, it was necessary to use 20 cc. of solution instead of 10 cc. for the treatment with $H_2S$ because of the large sized sample that had to be employed. Therefore 10 cc. of chloroform (instead of 5 cc.) were used in removing the CuS precipitate. It was also found easier to manipulate the 25 cc. volume in a 50 cc. volumetric flask properly graduated.

For manganese the periodate method used was essentially as recommended by Lindow and Peterson (23). The precipitation of $CaSO_4$ from the spinach sample was troublesome. This difficulty was overcome by chilling the solution in iced water after the $CaSO_4$ first became perceptible. The crystallized $CaSO_4$ could then be filtered off and thoroughly washed with diluted $H_2SO_4$ (7.5 to 100 cc. of $H_2O$). No other modification was made.

The method for iron was essentially that of Kennedy (28) in which the thiocyanate is removed from the water solution with amyl alcohol. It was found that comparable results were not obtained unless the acidity of all samples and the standard were the same. Ordinarily, for the portion in which the color was to be developed, the standard acidity was equivalent to 80 cc. N/5 acid. When excessive amounts of $H_2SO_4$ had been used in the wet ashing, the samples were adjusted to be equivalent to the one showing the highest degree of acidity.

With these three methods good duplicate determinations and satisfactory recoveries (93 to 100 per cent) were obtained.

## RESULTS

With respect to yield and general appearance of the plants there were no notable differences between the treated and untreated plots of either the spinach or the lettuce.

The effect of these salts added to the soil on the mineral constituents of the plants is shown in table 1. The *total ash* content of the spinach

TABLE 1

*Mineral analyses of spinach and lettuce from experimental plots*

All figures calculated on the dry basis.

| PLOT PLANTED MAY 28 | MINERALS ADDED JUNE 10 | IRON | COPPER | MANGANESE | TOTAL ASH |
|---|---|---|---|---|---|
| | *pounds per acre* | *mgm. per kgm.* | *mgm. per kgm.* | *mgm. per kgm.* | *per cent* |
| Spinach | Copper sulfate | | | | |
| I | 15 lbs. | 188 | 3.1 | 22.9 | 22.30 |
| II | 20 lbs. | 202 | 4.0 | 18.6 | 19.59 |
| III | 20 lbs. in 4 pts.* | 210 | 3.9 | 19.7 | 20.95 |
| IV | 25 lbs. | 200 | 4.5 | 22.5 | 21.57 |
| V | 50 lbs. | 218 | 5.6 | 20.8 | 21.93 |
| VI | None | 197 | 3.9 | 28.4 | 21.77 |
| Lettuce | | | | | |
| VII | 15 lbs. | | 4.9 | | |
| VIII | 20 lbs. | | 4.7 | | |
| IX | 20 lbs. in 4 pts.* | | *12.3* | | |
| X | 25 lbs. | | 4.4 | | |
| XI | 50 lbs. | | 5.4 | | |
| XII | None | | 3.1 | | |
| Spinach | Manganese sulfate | | | | |
| XIII | 50 lbs. | 219 | 3.2 | 29.6 | 22.44 |
| XIV | 100 lbs. | 162 | 3.1 | 27.3 | 21.05 |
| XV | 100 lbs. in 4 pts.* | 187 | 3.3 | *41.0* | 21.67 |
| XVI | 150 lbs. | 160 | 3.6 | 30.9 | 22.43 |
| XVII | None | 161 | 2.7 | 19.6 | 22.50 |

* June 10, 20, 30 and July 10.

was not materially altered by the addition of either the *copper* or the *manganese* salts. The variation in the *iron* content, may or may not be significant. The *copper* content of the spinach from plots treated with *manganese* was comparable to the control plot, the average being 3.2 mgm. per kilogram of dry spinach. The same was true for the *manganese* content of spinach from the plots treated with *copper*, this average being 21.0 mgm. per kilogram. No explanation is evident for the high manganese content of the spinach from the plot that served as a control for the

copper group. Since but slight changes in iron, manganese, and total ash were noted in the spinach from the plots treated with copper, these determinations were omitted in the study of the lettuce.

The *copper* content of the *spinach* from the *copper* treated soil was not appreciably increased unless quantities as great as 25 or 50 pounds per acre had been used, for which plots the copper content was 4.5 and 5.6 mgm. per kilogram respectively. All the samples of *lettuce* from the *copper* treated plots showed a greater *copper* content than that of the control. The plot treated with the largest amount yielded lettuce of only slightly greater copper content than the plot receiving the smallest amount. However, the lettuce from the plot treated with *copper sulphate* in *four installments* showed a *copper* content of 12.3 mgm. per kilogram which was 167 per cent above that from the plot which had received the same quantity of copper in one administration and approximately 300 per cent above that of the lettuce from the control plot. Elvehjem and Hart (18) observed but a 148 per cent increase in the copper content of lettuce when 500 pounds of $CuSO_4 \cdot 5H_2O$ per acre were added to the soil. No mention is made as to whether this was administered at one time or in several installments.

The *manganese* content of each sample of spinach from manganese treated plots was greater than that of the control receiving no manganese. The higher levels of manganese, if added in one installment, stimulated no greater storage in the plant than the lesser quantities. However, the spinach from the plot treated with $MnSO_4H_2O$ in *four installments* showed a *manganese* content of 41 mgm. per kilogram which was 37 per cent above that from the plot which had received the same quantity in one installment, and 109 per cent above that from the corresponding control plots.

These two instances of an increase in the storage of mineral by a plant when a salt of the mineral is applied to the soil in several installments may be of real significance, and warrants further investigation by agriculturists. The use of highly soluble salts of both copper and manganese in this experiment makes it quite possible that the mineral remained available to the plants for only a short time. Thus, a fresh supply of mineral becoming available to the plant at intervals until nearly mature apparently favors storage of that mineral by the plant.

## CONCLUSION

These limited data seem to indicate that the copper and manganese content of spinach and at least the copper content of lettuce are depend-

ent upon the availability of the respective mineral in the soil. It is probable that soon after the salts were added to the soil they may have become unavailable to the plant. Therefore it may be reasonable to conclude that some of the variations in the reported manganese and copper content of foodstuffs are due to differences in the quantity and in the availability of the copper and the manganese in the soil. The iron and the total ash content of spinach did not seem to be changed by the additional copper and manganese in the quantities employed in this experiment.

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# HOW THE FOOD CLINIC CONTRIBUTES TO THE MEDICAL CARE OF THE OUTPATIENT*

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*The Food Clinic, Boston Dispensary*

This paper asks you to consider the need of food treatment as an aid to medical treatment of the ambulatory patient, and the degree in which this need is being fulfilled in the dispensary or outpatient department.

The outpatient department is recognized as an important development in the means of caring for the sick. In a paper (1) by Mr. Frank E. Wing, Director of the Boston Dispensary, it is stated that according to a report of the American Medical Association, 6,645,000 patients were treated in 1,027 outpatient departments in the year 1930, with a total number of 19,000,000 visits; and that from information received concerning other outpatient departments and thousands of clinics not connected with hospitals, which did not enter into the report of the American Medical Association, competent authorities estimate the number of visits to all clinics to be as great as 40,000,000.

Now food is the most important social factor in the life of every human being. In a recent newspaper a notice of a report to the U. S. Census Bureau contained the following statement:

"Food stores led in volume in net national retail sales in 1929, amounting to $50,033,850,792 as reported from 1,549,168 retail stores to the Census Bureau from 957 separate cities and forty-eight States."

We are witnessing events today that indicate how international relationships are affected by our universal dependence upon the adequate supply and distribution of food. Indeed, the abundance or dearth of food, its cost and distribution, affect indirectly but intimately the therapy of every patient. Further, the study of the composition and chemical action of foods is concerned with the effect of food in building the body, and with its use in compensating for certain dysfunctions of the body. Physiology, pathology, psychology, psychiatry and sociology are concerned with the relation of food to the body. Certainly then, careful,

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intelligent food guidance should be a part of the medical treatment of many of these millions of people who come to the outpatient departments. How sadly the past has failed thousands of patients with diseases that could have been and today are being treated successfully by dietary means!

In the case of the hospital patient, food treatment is a recognized part of medical care. That principle has been so clearly accepted that no Grade A hospital in this country is without a dietary department.

Why has there been such inertia in organizing the means for dietary treatment of the outpatient? At the present time, according to a study made by Mrs. Esther Simon of Portland, Oregon, there are twelve food clinics in operation in the entire United States, and eight more are being organized, following the establishment of the first food clinic in 1918 in the Boston Dispensary.

It is clear that technique of treatment, and the approach to the patient in the food clinic will be very different in many ways from the practice in the hospital, although similar in some respects. The food clinic will not entail a special department for buying, storing and distributing food, and preparing and serving meals for patients in accordance with special diets. The outpatient himself will buy, store and prepare the food that will meet his body requirements, necessarily keeping his expenditures within the range of his limited income. He, or the homemaker or provider of income in his family, will assume some of the duties assigned to the administrative dietitian in the hospital. Moreover, the outpatient must have an appreciation of the values of food for the body's needs, and understand how his special diet will serve him. To him will be transferred, in large measure, the responsibility for carrying out the prescribed diet. This is in sharp contrast to the patient in the hospital, who needs to assume no responsibility for the preparation and value of his food intake, and needs to have no anxiety as to its cost. Moreover, while the hospital dietitian knows that the diet she plans will be followed, that the patient will eat the food prepared for him since perforce he must, it will be necessary to educate the outpatient so that knowing what his diet means he will keep to it voluntarily. The checking up that he will receive in after visits will confirm his knowledge and strengthen his resolution.

Incidentally, it is true and important that the outpatient dietitian must be equipped to teach not only the patient, but his family and the groups outside the family that are concerned in the patient's future physical, mental and social welfare.

Again, the physician in the hospital may prescribe any diet and be assured that it will be given to the patient under the intelligent guidance of the dietary department. The physician to outpatients should have approximately the same service; for the same diseases requiring dietary treatment are met in the outpatient department as in the hospital.

The force of these considerations is now being recognized, and the food clinic, under the guidance of the outpatient dietitian, has come to fill the need. The following quotation is from a report of the American College of Surgeons (2):

"More and more is the dietitian assuming a status in the out-patient department. Here the food clinic, an innovation of recent years, renders a most valuable service in the care of ambulatory patients. In this clinic the dietitian has opportunity to assist the clinician in guiding the course of diet for the patient. Patients are referred to the clinic for consultation and advice regarding their diet, particularly as related to the disease for which they are being treated."

And Dr. Strauss, Chief of the Medical Clinic of Washington University Dispensary, in St. Louis, has written as follows (3):

"What are the special conditions with which we deal in the out-patient clinic that may be benefited by the services of a dietitian? To answer that question is to list every disease in which dietary advice is indicated. . . . . First in the list is, of course, diabetes . . . . . Next, perhaps, we should mention the various gastro-intestinal disorders of which duodenal or gastric ulcer is probably the most important. . . . . The various types of constipation with and without accompanying disease. . . . . Colitis, esophageal obstruction, gall-bladder disease, etc., all require a dietetic régime . . . . obesity, whether it be of the simple alimentary type or associated with endocrine disturbances . . . . malnutrition, whether it be secondary to such disease as tuberculosis or chronic cardiac disease, or anemia . . . . asthma or other food allergies . . . . nephritis . . . . hypertension . . . . arthritis. . . . . The deficiency diseases, scorbutus, pellagra, rickets, etc., all require a careful dietetic régime for prevention and cure."

I should like to tell you of the actual organization and activities of a food clinic, such as that in the Boston Dispensary, and its relation to the medical clinic.

It is an integral part of the Dispensary and one of the special clinics of the medical department, both adult and children's. It functions like every other clinic in administrative matters, caring expressly for the problems in its own field and affiliating itself with other clinics where

there is need for joint service. The clinic executive in the medical department, who in this case is a social worker, serves the needs of the patient in the food clinic, as in all other special clinics of that department, sees that he is properly directed, followed up for return visits, and given social assistance if it is needed.

It is an important principle of procedure that before the patient, adult or child, can receive treatment in the food clinic, he must first have a complete physical examination in the medical clinic, with all necessary laboratory tests, and thence be referred by the physician to the food clinic. A patient coming to the Boston Dispensary may be admitted directly to such special clinics as the Orthopedic, the Eye, the Ear-Nose-and-Throat and the Dental Clinics. If he were referred to the food clinic directly from one of these, the important data revealed by the complete physical examination would be lacking. The patient's record, sent to the dietitian, contains the findings from all clinics that the patient has visited, and also the physician's diagnosis and recommendation for food treatment. This assures the dietitian the necessary data on which to base a diet.

Where, in the outpatient department or dispensary, shall we locate the food clinic so that it can most effectively relate itself to the work of other clinics and to social service, and develop its methods and possibilities in harmony with the general development of the institution of which it is a part? That it should be placed for easy communication with the physicians of other clinics, and that it have a space of its own, are guiding principles. It may contain but a desk and two chairs, at first, which will at least indicate that it is an entity. But the evolution of the food clinic has now gone far beyond that, and it is assigned at least one room, and usually more space.

Let us enter such a room. It is furnished in accordance with the belief that a cheerful environment, with things of interest and beauty in it, and reflecting friendliness and sympathy, will break down reserve, so that the patient, when his turn comes for consultation with the dietitian, will talk as to a friend. The foreign-born patient brightens when she sees the samovar and the vessels of shining brass and copper, or when her child shows her where her native country is on the decorative map of the world that hangs on the wall. She is moved to talk about the home of her childhood, and in doing so feels at home in the Clinic. The pictures and posters are beautiful and educational, and there are plants and flowers. Artistic vases purchased at the "5 and 10" have demonstrated to a patient that she, too, can afford a pretty vase in her home.

A patient notices the cleanliness of the aluminum cooking vessels, and another decides that she will paint her furniture in the colors of the Clinic tables and chairs. When for some special reason a patient is served with a food or a meal, she appreciates the manner in which it is set out on the tray.

These things assure the patient of understanding treatment, and he talks the more freely of himself, his home, his habits, his difficulties and his hopes, giving to the dietitian valuable clues to his personality and to his home environment that she will make use of in adapting his diet to his needs.

In such a spirit of mutual interest and sympathy the dietitian and the patient meet in the Food Clinic.

In planning the patient's diet the dietitian utilizes the findings on the medical record and the data taken on admission—brief statements concerning race, nationality, number in the family and income. But she needs to know more; for social and domestic conditions, food and health habits affect greatly both the diet plan and the desired outcome of food treatment. And so the dietitian has an intimate conference with the patient in which, aided by the information he has freely given in response to the friendly clinic atmosphere, and careful to question only as she must for the knowledge she needs, she secures further data for a nutritional history. The special form used for this purpose becomes a part of the general record. It gives data concerning family relationships, household equipment, food and health habits, community hygiene, recreation, occupation, school life, home lessons, extra lessons and activities, education, the daily food intake, hours and places of eating (whether at home or in restaurants or at school), the patient's economic status and the family income. It will also record the dietitian's impression of the patient's mentality, his ability to carry out a plan of treatment, and the influence of national and religious customs. Thus she secures a comprehensive picture of the social, mental, physical and economic factors that concern her patient. A diet can be successful only when adapted to the patient's possibilities, interpreted in terms of his abilities and the influence of his environment.

The present interest in science and biography written in popular form is an indication that many scientific facts can be clearly and simply enough stated to be generally understood and to arouse interest. The principles of physiology and nutrition, the functioning of the different organs of the body, the purposes and action of food in the body likewise can be explained to the patient in terms simple and clear enough to give

him such correct information concerning himself as will serve for intelligent self-guidance. For the Food Clinic patient must follow his diet without immediate supervision between his visits to the Clinic. Moreover, understanding the reason for his diet, and the principles underlying it, he will adhere to it far more readily than if it were given him as an order without explanation, or unrelated to his physical condition or environment.

Therefore, the patient must understand that the body builds itself, generates power for its activities and safeguards and promotes its well-being, all by means of proper amounts and kinds of food. He will be led to see that the body's processes go on by transference to the body of certain constituents in food. The patient will then realize the necessity for keeping a proper balance between the body needs and the foods that supply them; and that in disease it may be necessary to modify the amount, kind or consistency of food in order to compensate for the deviation in normal functioning of the body part that is affected. It is this interrelationship between food and the body's needs, in health and disease, that the dietitian educates her patient to understand.

Knowing the body's uses of the various food constituents, the patient is taught to become conscious of the values of the foods in his diet, in terms of their food constituents, and how he can include these in right amounts in the daily menu. And since the dietitian does not administer to him in the home, but must stir him to take effective action there in his own behalf, it will be seen that she must have the qualities of a good teacher. On this point, Dr. Lydia J. Roberts says (4):

> "Take all the knowledge of nutrition possessed by the college teacher of nutrition, the special knowledge and experience of the hospital dietitian with diet therapy, the sympathy, understanding and teaching ability of both the primary and high school teacher, the knowledge of human problems and some of the technique of the social worker, and the knowledge of factors influencing human behavior possessed by the psychologist. To these add: all the persuasive arts of the advertising artist, the high pressure salesman, or the stump orator, and you will have an ideal social service dietitian."

It is important that she shall have also an appreciation of the principles of mental hygiene, to understand the cause of the food idiosyncrasy or prejudice, and especially the deep-lying motive actuating the behavior that is detrimental both to health and to the success of food treatment. There is often a deep relation between the patient's mental life and his food and health habits. Unhappiness or anxiety, fears, whims, self-

indulgence, over-indulgence, feelings of inferiority are a few of the broad classifications as they are found in actual cases, in which maladjustments arising in home, school, or employment affect the successful carrying out of the diet. The work of Cannon and others clearly demonstrates the influence of emotional disturbances upon digestion, and much has been written on anorexia and the "nervous child" with table tantrums (5).

What the eye sees helps the mind to understand and remember. And here a word about the wealth of illustrative material that is available to the dietitian, in addition to what she herself can devise. to help her to interpret the principles of nutrition and food values to different levels of intelligence in her patients. Printed lists of foods classified according to their food values, charts, posters, pictures, and wax models of foods and prepared dishes in household measures are invaluable aids, in addition to the spoken word, in explaining and demonstrating to the patient the diet he should secure for himself. As a result he does not need to weigh his food; for he has visualized it in the Clinic, in the actual amounts and kinds his diet allows. By these means, too, he is taught the possibilities of exchanging foods for others of equivalent value, enabling himself thus to vary his diet and partake of the foods prepared for the rest of the household. There is no need, then, to think of himself as different from his family and friends, or as set aside and barred from their food and activities. Moreover, he becomes so thoroughly conversant with his needs and how to meet them that he can take vacations during treatment, and visit his friends with perfect safety. For he knows how to care for himself. Education has made him free. All this has an important influence upon his mental attitude.

The wax models are especially helpful as teaching material for work with the individual patient or a group. They are always available, and involve no expenditure of effort in preparation or cooking. If one should estimate the cost, in money and time, of using real foods always for demonstration, it would be seen that wax models are in the end economical.

As it is not often that a patient lives alone, the family, too, must be made to appreciate the principles of nutrition and diet. The child in particular is dependent upon the mother.

What is the attitude of the home people? Will they understand and help? In the hospital this does not have to be considered while the patient is there, for however long a period; for every order will be carried out by the medical, nursing and dietary departments. But with the

outpatient the need of conforming to family régime almost immediately, lack of intelligence or of the spirit of coöperation on the part of the family, and restrictions of income have a tremendous influence. So food treatment of the patient often involves the education of the family—and this is a matter of greater difficulty when the family does not understand English. In such cases means of visualization are imperative necessities. Let me illustrate. An Italian, a fisherman, came to the Diabetic Clinic. In his family only his 12-year-old daughter could understand English. He had to take insulin. Units—grams—these terms meant nothing to him. But he could see, and he learned, without spoken explanation, to give himself the proper dosage of insulin, at home and on the sea. He learned his diet by seeing the portions of food that could be allowed him, and with the help of the pictures on the wall. He pointed with a questioning gesture to the grapes in a beautiful food poster. The dietitian immediately showed him, with lumps of loaf sugar, the high sugar content of grapes, and there followed a comparison of fruits, until it was clear to him what kinds and amounts he could eat with safety.

The man was anxious to have sympathy and understanding at home. How could we educate his wife to help him? We taught his bright, clever little girl, and she taught her mother the kinds and amounts of food the patient could have. The whole matter became clear to the three, and now the man receives at home the encouragement and sympathy he longed for.

Teaching the patient thus, and his family if need be, in his first visits to the Clinic, may seem to take a great deal of time. It does. But the results show that the diet is better understood, and carried out more intelligently and effectively. Further, the patient is grateful to the dietitian for the explanations that will guide him throughout life. In return he gives her a confidence in which he reveals his real inner self, helping her to a truer conception of his needs. Time spent to such an end is economically spent.

In a report (6) of a teaching demonstration conducted in New York City by the Association for Improving the Condition of the Poor, in which the food intake of certain families guided by instruction in food values was compared with the food intake of a group not so influenced, the writers say:

"While such intensive instruction as was necessary to bring about these improvements in diet may be questioned on the basis of expense, the results justify the expenditure. The children in the influenced families were receiving

a larger reserve of health, which should make them better able to resist disease, yet their food was costing less than the food in uninfluenced families. This saving in the amount spent for food more than covers the cost of teaching."

Upon this foundation of mutual understanding the dietitian plans the patient's diet, fulfilling in it all scientific requirements for mental and physical health and at the same time adapting it to the patient's social necessities and possibilities.

After the food intake of the patient is recorded, and then analyzed and judged by the dietitian, the food order is written out for the patient, with the total amounts and variations in kinds and amounts of food. If necessary, menus are added, and recipes as well. On each return visit the intake of the patient is recorded, for the information of both physician and dietitian. Through experience the dietitian is able to estimate how successfully the patient has carried out the food order for his diet or to what factors to assign his failure. It gives her a fresh view point as to his possibilities and limitations, and it stimulates her anew to achieve her purpose in her work with the patient. No printed, ready-to-hand diet is used. For there is no flexibility in the printed diet to take care of needs that differ with each patient. Moreover, given a printed diet, the patient would not know how he could safely vary it.

When it is revealed during treatment that the patient needs care in other clinics, or that he or his family is unable to provide the food that effective treatment requires—so often the case—or that adjustments are desirable in the home or school or occupational environment, the Food Clinic turns to the social service department. The Clinic executive in the Medical Clinic, who is a social worker, may be able to handle the situation, or she may refer it to a special case worker. Where financial assistance is required the dietitian supplies the social worker with the diet plan and the cost of the diet, and these are usually accepted by the outside relief agency to whom the case worker may need to refer. All contact with the patient outside the institution, and all contact with the outside relief agency is made through social service, the physician, dietitian and social worker being in agreement upon the policies of medical and dietetic treatment. For the physician maintains constant medical supervision of the patient in the Food Clinic.

Thus, the doctor, the dietitian and the social worker become a unit in service to the outpatient, the doctor making the diagnosis, the dietitian translating the doctor's food recommendations into a definite, understandable diet plan, and the social worker aiding in all advisable ways

to make conditions favorable for the greatest possible success of the treatment.

In the Boston Dispensary there is a Health Education Department affiliated with the Food Clinic, which in various ways teaches food and health habits to all patients assembled in the various clinic waiting rooms as another aid to medical treatment. The work is under the supervision of a full-time health educator, who is assisted on Saturdays by school teachers, and by volunteers on other week days. While the children wait for treatment in the Food, or Dental, or Children's Medical, or Ear-Nose-and-Throat Clinic waiting rooms, they gather around tables and discuss with one of these teachers the way in which a food substance —calcium, protein, food iron, healthful sweets, vitamins, etc.—or a health habit helps the body to keep well. It is done happily and informally, with repeated emphasis of principles through things which the child enjoys—the story, game, experiment, motion picture and handwork. And here, again, illustrative materials are sought and devised that will impress the visual memory. Adult patients and guardians are interested onlookers. The health educator develops the teaching plan,[1] and furnishes it each week to the teachers.

Mothers' meetings, once a month, bring the principles of child health directly to the parent and the home. Also the health educator devises educational exhibits, and with pictures and posters and other furnishings that are passed upon as to their artistic and educational merit, placed in various waiting rooms, she tries to interpret to all patients the meaning of health.

This paper has attempted to show the importance of nutrition and diet therapy in medical treatment, and the need of teaching the patient, and often the family, the relations of food to the body, as a curative and preventive measure. Such educational work the hospital or outpatient department that has a dietary department is well equipped to do. The physician can depend upon the dietitian to assist him, but what of the institution that is not so staffed? And how will this need be met in the case of the thousands of patients that come to physicians' offices?

The following is quoted from a report (7) prepared by Mr. Michael M. Davis concerning the clinics in New York City:

"In the course of a single year, about 2,500,000 people suffer incapacitating illnesses. . . . . Of the three to four million persons who annually seek

[1] A collection of these lesson plans is soon to be published.

medical attention while not sufficiently ill to be in bed, about one million secure it from doctors practicing in clinics, but the bulk of such service is rendered privately in doctors' offices."

How will such patients receive the instruction that will bring about improvements in diet and health, with a wise budgeting of expenditures for food—instruction that will guide them in purchasing and preparing foods in right amounts and kinds for health and the conservation of energy and money?

At present, according to the data in the report of the committee on teaching in the medical schools, various schools are registered as having courses in dietetics. Even though the student may know the theory of the body's growth, maintenance, repair and activities, and how food can compensate for many chemical and physical changes that occur in disease, how vital has the instructor made this knowledge? The important factor is the person—the patient whom this knowledge should serve. Without him the theories of science remain academic. Applied to him they become practical measures for the promotion and maintenance of health.

Moreover, the patient has a personality and an influencing environment. Does the teaching in the medical schools recognize this, in all its bearings? It was appreciated by Dr. Francis W. Peabody, who wrote (8):

"What is spoken of as a 'clinical picture' is not just a photograph of a man in bed; it is an impressionistic painting of the patient, surrounded by his home, his work, his relations, his friends, his joys, sorrows, hopes and fears."

What, specifically, has the clinical or outpatient dietitian to offer to the medical student?

A place such as the food clinic where he can observe and have actual practice in applied dietetics—giving the diet in terms of the patient's ability to carry it out, and watching results.

Through practice, a knowledge of methods and materials helpful in teaching the patient and in visualizing to him the principles underlying his diet.

Practice in the use of charts and tables for computing diets—tools in the use of which practice brings skill.

For such training the food clinic is meeting the needs of physician, nurse, and dietitian, and of many other types of students of health problems, such as students of public health, home economics, and social

service, who must give consideration, in their work, to the food of the individual or family they are helping. The training is adapted to the particular needs of each, the point of departure being the student's special interest.

As the food clinic develops its methods, and tests and clarifies them, it will find that the results will be of value to other organizations and workers. The Food Clinic of the Boston Dispensary has repeated requests for a statement of its organization, principles and methods, to which it responds not only by letter but with printed articles for both the profession and the public. And so, besides its immediate activities of food treatment and student training, it also extends the knowledge of the usefulness of the food clinic. In the last year it has prepared in mimeograph a set of tables for simplifying the means of computing a diet, for the use of dietitians and students.

Mr. Michael M. Davis remarks, pertinently, in his report on the "Medical Care of Millions," already quoted:

"It is cheaper and better for the patient and the community to deal with disease while the sufferer is able to be up and about than when he is obliged to be in bed."

Again, Dr. Joslin writes, in a paper entitled "An Appraisal of the Present Treatment of Diabetes" (9):

"Diabetes will never be successfully attacked until the patient, his family, the community, the physician and the hospital are *trained* in the prevention and treatment of the disease and its complications."

Let us compare with this statement the kind of treatment the outpatient receives in the Food Clinic, as it has been described in the earlier part of this paper. The outpatient is taught to understand his diet, its food values, how it meets his particular need, and the necessity for adhering to it for good results, the use of insulin and the importance of personal hygiene. The family is educated to understand the patient's needs, and the home and school or occupational environments are studied to render all factors as favorable as possible for successful treatment. In cases of inadequate income special provision is made to enable the patient to secure his diet.

This intensive training and care of the patient in the dispensary or outpatient food clinic is a saving in dollars and cents to the hospital; for it often makes it unnecessary for the patient to enter the hospital,

and it cares for the patient that has been discharged from the hospital. And because it enables the patient to continue in his occupation, it provides not only a saving to him and to the community; it makes him a far happier member of his household and community.

The obvious query is, what is the cost of running a food clinic? We will again use the Boston Dispensary as an example. Last year (1930) 3,576 visits were made to the Food Clinic, at the cost, per visit, of $3.70. This includes both direct and indirect charges. Besides the salaries of the three dietitians, it includes the cost of the Health Education Department, the salary of a half-time social worker, and the charges assigned to it from all the services of the Dispensary of which it partakes as an integral part of the whole institution—the apportionment of expenditures for the record room, admission, the cashier and other departments and services, for general administration, for light, heating, cleaning, laundry, repairs and renewals. The equipment of a food clinic would necessarily include a stove, sink, refrigerator, dishes, utensils and closet, besides tables, chairs, desks and bookcases. The cost of the Health Education Department, for salaries and educational materials—salaries being the larger part—was $2100; of the half-time service of the social worker, $840. Deducting these two items and so only considering the direct charges for salaries, supplies and apportionment for service, brings the cost of food treatment per visit to $2.20.

In the Boston Dispensary last year, the sum of $1946.70 from a fund contributed by the South End Diet Kitchen, referred to below, was used for food for the patients in the Clinic and in their homes. This sum is not included in the cost per visit, as estimated above.

The Food Clinics of the Boston Dispensary and of the Outpatient Department of the Massachusetts General Hospital are fortunate in having financial assistance from the South End Diet Kitchen and the North End Diet Kitchen respectively.

The purpose of these Diet Kitchens, established in the last century, was the "distribution of food to the sick poor." Their funds are now given to the two food clinics above mentioned, so that food may be provided in terms of advanced medical treatment and the newer knowledge of nutrition. They enable these food clinics to consider food as medicine, and to provide it to patients under special conditions, approved by the administration and the Chief of the Social Service Department.

Like so many other departments, expenditure by the food clinic depends upon the stage of its development, the type of work it undertakes

and the number of dietitians required according to the number of patients. A clinic may be organized with one dietitian only, using available space already cared for as to light, heat, etc. That would mean little added expense for overhead. In time, recognition of its value and increasing demands upon it would require more dietitians and additional space and equipment. The experience has been that the food clinic has proved of such worth in the economy of service and money, that it becomes adequately staffed and equipped. Again some outpatient departments have planned immediately for a food clinic, with adequate equipment, upon faith in the experience of others.

In ending this plea for the establishment of the food clinic as an aid to the outpatient and to the physician, I quote again from the Report of the American College of Surgeons:

"Hospitals possess potential powers which frequently lie dormant and undeveloped, and which can and should be activated. . . . . This awakening of latent power will add greatly in widening institutional prestige and favorably influencing its usefulness to the community."

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# QUANTITY COOKERY*

ARNOLD SHIRCLIFFE

My assumption is that I was requested to talk on "Quantity Cookery" because I am not an advocate of quantity cookery, except in certain cases. First, I should like to know just what is understood by "Quantity Cookery;" does it start at ten, twenty-five, or fifty portions? To cook fifty orders of very tender string beans or broccoli, unless it were done in a huge flat vessel where the contents could be spread out and dished up carefully, would be a calamity. To cook fifty portions of tender, pink, hothouse rhubarb in one container would be a mess, unless handled as above. Twenty to thirty orders of asparagus, each order tied up separately and then cooked, should be considered quantity cookery. Twenty-five orders of tender green cabbage is quite enough to be cooked at one time in one pot, after being cut and tied in portions. The same number of orders applies to Brussel sprouts and young okra. The boiling of green peas is a real science. Fresh, young peas should never be cooked in greater amounts than twenty-five orders at one time in a single container; even canned peas, when dumped in large amounts in one container for heating, make a messy appearance.

At the Belden Stratford Hotel we cook all of the above mentioned vegetables in small amounts, up to twenty-five portions, in one container; then wash and chill and re-heat each individual portion to order. You may ask why we do this. We carry from ten to sixteen fresh vegetables on the menu at all times. These vegetables must be ready to serve when called for, and as it is impracticable to cook vegetables to order we have a certain amount of each cooked and ready to re-heat when ordered. This is done by heating them in individual pans. The vegetables are placed in a pan with a little butter and vegetable stock, seasoned, heated quickly and served. This method is used on à la carte service. On the table d' hôte service, the vegetables are kept hot, after being cooked, in the bain-marie where they are placed in crocks or enamel pans, each containing from ten to twenty portions. For superior work in vegetable cookery, and if appearance is to be stressed, cook in just as small amounts as possible and serve as quickly as you can after cooking.

* Presented before the Administration Section, American Dietetic Association, Cincinnati, October 20, 1931.

There is an additional cost to be added to your vegetables every time they are cooked in too great quantities and every time they are re-handled. It takes more messy vegetables to make an order than it does of properly cooked ones of excellent appearance. For instance, it takes two or three orders of practically any vegetable to make a portion of puree, and just think of the vast amount of near puree which is being served because of over-cooking or too much handling.

Baby carrots, turnips, beets, etc., should be cooked in amounts of not over fifty portions, and only in pots where they would not be piled over three or four high. These very tender vegetables cannot stand weight and have a low saturation point.

Spinach (broad or curly leaf), young kale, dandelions, young mustard greens and escarole are cooked in an open pot, and up to one bushel in quantity in a single container. The entire amount is put in at one time and no additions made when volume has been reduced in size.

Dry vegetables, boiled, can be handled in large amounts, as long as you allow enough water, when boiling, to keep them dancing in their own separate pool. The re-handling of cooked dry vegetables presents quite a problem, and losses are frequent unless cookery is carefully watched.

New potatoes, when steamed, should not be piled over five high; old potatoes not over three. When baked in pans they should just fill bottom of pan. They should be served as quickly as they are cooked. If the service is of long duration, the amounts needed should be cooked at intervals so that they come out of the ovens as needed. Boiled potatoes should not exceed one hundred orders in one container and should be of the same size. Some potatoes cook more quickly then others and mash under the weight of those on top. Potatoes, graded and of the same variety, should be boiled together; mixed varieties do not come out with the same nicety of appearance, color or shape as the graded one-variety do.

Old turnips, rutabagas, carrots, parsnips, celeric, celery root, parsley root, beets, and vegetables containing much connective tissue could be cooked up to two hundred orders in one container. I believe this should be the limit for vegetables cooked in one container at one time.

Large amounts of soups, stews, ragouts and sauces never seem to be so well seasoned and do not have the fine flavor and appearance of those cooked in smaller amounts—they lack finesse.

Soups of a delicate nature should be made in small quantities (five gallons), while those used as bases, i.e., consommé, broths, white and brown bases, etc., may be prepared in any quantity up to twenty-five gallons in one container, then finally seasoned in smaller amounts.

Mayonnaise may be made in any quantity necessary, however, it is best not to prepare more than ten gallons in one container at one time. French dressing may be made likewise. A thorough emulsification of French dressing will hold ingredients in suspension for several days. Mayonnaise kept at the same temperature after being properly prepared, will not separate or break so quickly as mayonnaise which is made properly, but which is constantly being moved in and out of ice boxes.

It is all right to prepare as many rib roasts of beef as you have need for, or have pans and ovens for proper handling. A rib roast of beef should "set" at least an hour on the table or carving stand before being used. In this way the beef is allowed to become firm and better fitted for carving. The roasting of fowl, veal, or lamb, can be done in any needed quantity as long as there is room in the pans for the meat to roast properly, and if the finished product can be used up quickly. Roasts lose cast and weight when allowed to remain a long while on steam tables. Meat stews should be made in quantities varying with the age of the animal or fowl: in small amounts for the very young, and in larger amounts for the older; forty portions of the former and up to two hundred portions, or about fifteen gallons, of the latter. If one lifts out delicate, tender meat cooked in large amounts, there is a tendency for it to "sliver and string off" no matter how nicely it is handled, and in consequence it cannot be served to perfection. With the tough and old, there is a tenacity of connective tissue which often defies disintegration, no matter how roughly you handle it, but for the seasoning and care of the vegetables which are in the stew, I believe that fifteen gallons to one container is enough. For nicety of appearance in the vegetables to be used in stew, they are often boiled separately and added just before stews are served.

Certain types of entrées, such as chicken à la king, lobster Newburg, crabmeat Dewey, oysters à la Poulette, shrimps creole, etc., should be made in small amounts for finesse, delicate seasoning, and superior work; twenty orders in one container is the limit.

Delicate sauces, such as Mousseline, Hollandaise, Béarnaise, Sabayon, etc., should be made in small quantities, from one pint up to one gallon. Other sauces, such as the bases, espagnole or brown sauce, vélouté, etc., can be made in any quantity up to twenty gallons in one container.

In the better class hotels, clubs and restaurants, the cooking of foods is done in small amounts, with the exception of the breads, soups and sauces aforementioned. There is a reason for this, that most hotels have quite a large menu and that food service continues from 6:30 a.m. until

midnight. There never is an exceptionally large demand for any one item at one time, so that many foods can be cooked in small quantities at regular intervals throughout the serving of meals, and other foods already cooked may be re-heated to order. Steaks, chops, grilled and fried chicken, broiled, poached, or sautéed fish, grilled lobsters, ham, bacon, etc., are cooked to order. Food handled in this way will always have an appeal to those who seek flavor and know fine cookery.

Many years ago hotels as well as hospitals worked strictly on the American plan; that is, they sold food and bed at a fixed price. As early as the seventies, the managers of hotels found out that it was not good practice to force their guests to eat the type of food the managers were willing or able to produce. With this change of mind, the European or à la carte plan of service came into use in the hotels in America. This change gave the guests a chance to choose the kind of food they liked, cooked the way they wanted it and at a price that fitted into their scheme of things. Perhaps some day hospitals too will adopt this type of service, a service that will allow the patients to select the type of food they desire and to pay for it as they do at a hotel. If the "bed and board" idea at a fixed price could be divorced from hospital operation for those that are willing to pay for this class of service, I believe it would be a step in the right direction. If this type of service were adopted by hospitals, it would give the dietitian a chance to figure food costs in the same way as they are now figured in hotel, club and restaurant operation. Such a service should produce additional revenue and decrease certain losses which now occur in attempts to please a few isolated patients. With this arrangement the patient who desired special service would be better pleased. His being pleased undoubtedly would speed his recovery, which in turn would please his doctor, who in turn would recommend such a service to the patients who could afford it.

The change from the old type of service to the new with its greater benefits, will, if accomplished, make you wonder why this change had not come sooner. The cooking of foods in small amounts is just another step towards finesse in cookery. The art of cookery—and it is a master art—should be handled with as great a care as surgery. The great Lister said: "I do not consider myself as hazarding anything, when I say, no man can be a good physician who has not a competent knowledge of cookery." The dietitian should have a thoroughly usable knowledge of cookery. Art *cannot* be standardized, and as I have said before, cookery is a *master art*.

The day is coming when hospitals must excel all others in cookery and in the service of food. The hospital is the one place where fine cookery and excellent service can do the most good for humanity; it caters to those who cannot help themselves.

# REDUCING THE LABOR TURNOVER OF DIETITIANS*

ELIZABETH DYER

*Director, School of Household Administration, University of Cincinnati*

When I first came in contact with the training of dietitians, I was appalled at the many changes in personnel in the dietetic departments of hospitals, restaurants and other institutions with which I was acquainted. When an effort was made to discover the reasons for the changes the answer always was "it isn't so bad now as it used to be." This answer gives some encouragement, but when one is advising and placing students one cannot be too complaisant. One is challenged to try to correct the condition, for failure and dissatisfaction in a vocation mean a great waste of human energy and happiness and often a warping of the personality of the individual who has had this tragic experience. Modern psychology has broken down the old tradition that character is best developed through suffering and disappointment. Even in character development, it seems that nothing succeeds like success.

A real contribution will be made to the field of dietetics if the number of failures, and persons dissatisfied with their jobs, can be reduced to a minimum.

For seven years I have been interested in observing and collecting data on this subject. The study has not been a scientific one and no effort has been made to use statistical procedure, but certain observations may be suggestive not only to departments that are training dietitians, but also to dietitians on the job, and to the men and women who are interested in making the work of the dietitian more far-reaching.

The three most important factors contributing to success on the job are: first, the personality of the dietitian—personality is used here to mean the sum total of the individual's habits and abilities; second, the attitude and point of view of the administrators and practicing physicians, and the efficiency of the organization of the hospital or institution; third, the training and experience of the dietitian. Let me hasten to add that there is nothing new or unusual about this analysis. We have all been aware of these facts, but can we not do more to create conditions that will make for success?

* Presented before the annual meeting of the American Dietetic Association, Cincinnati, October 21, 1931.

Consider these three factors for a moment. What personality qualities help one to succeed? There are at least four: health (physical fitness), the kind and degree of abilities necessary to fulfill the task, temperament suited to the task, and the right mental attitude toward the work. No one that I know of has ever worked out or studied just what abilities are necessary, and how much of any particular quality is required for success in dietetics. Here is an opportunity for research.

Given the personality and training appropriate to the occupation, success for the inexperienced worker is still directly dependent upon the conditions under which she must work. We all know of institutions where, under existing conditions, no dietitian could succeed.

The conditions in institutions that especially handicap a young dietitian are:

1. A board of directors or manager that has a wrong or inadequate conception of, or an unsympathetic attitude toward the work of a dietitian.
2. Co-workers who are jealous or suspicious because of a lack of understanding of the functions of a dietitian and the relation of her work to other departments.
3. Responsibility without authority.
4. Inadequate budget, inadequate help, inadequate equipment.
5. Long hours and living conditions that make normal living difficult.

It is a serious thing to place a young person full of hope, enthusiasm, and ambition in a department where conditions are such that no one short of a paragon could perform the job satisfactorily.

Colleges that train dietitians also have a grave responsibility. The many books on psychology that are flooding the markets afford evidence of the fact that people feel keenly the need of a better understanding of themselves and their fellows. In no field is a knowledge of human nature more important for peace of mind than in that of dietetics in hospitals, in commercial establishments, or in social service agencies.

Nixon, in "Psychology for Writers" presents a very graphic description of the way in which all of us attempt to attain peace of mind and a feeling of superiority. Dr. Nixon advises writers to remember that the instinct or drive for self-mastery or superiority is a powerful one, and that this urge is continually thwarted by barriers which must be overcome. The barriers may be physical or mental inadequacies, economic, social, or emotional handicaps.

We may attempt to overcome these barriers in two ways—either by a

direct or an indirect attack. In the direct method we strive to correct our weakness through mental and physical development which is the finest approach and the one most socially acceptable. Frequently, however, it proves too difficult, and we may then revert to the second or indirect attack, whereby we attempt to detour around barriers and achieve our goal through intrigue, deceit, or plays for sympathy.

If both of these methods prove too difficult, we build up certain avenues of escape, escape from the realization that we have not mastered a situation. We rationalize, we boast about our superior qualities; or we may change our goals, we may identify ourselves with people who have succeeded, and so we might continue the long list of mechanisms we set up to convince ourselves and our friends that we are superior individuals. Departments of nutrition in colleges have shown too great a disregard for this phase of training, but this condition is changing, and many departments are now recognizing the value of psychological study and are including it in their programs.

Another question is also perplexing colleges today. How can students who are unfitted for dietetics be discovered and eliminated? How can colleges assist in discovering aptitudes for the work? Perhaps the most difficult question for colleges to answer is, how can students gain a better knowledge of the job and more adequate training for it and at the same time be prepared for balanced living? Riggs, in "Intelligent Living" very forcibly reminds us that life is not all work!

"By a balanced life we usually mean one in which the physical and mental activities are nicely balanced or, if we happen to be thinking a bit more deeply, a life that also exhibits a good balance between the serious and the frivolous, between its work and its play. Both of these balances are of indubitable importance, and, if we may add one or two other points, I believe we can construct not only a clear but a faithful picture of the kind of life which is most apt to succeed, most apt to be happy, and least liable to breaks in progress, let alone serious maladaptations. The other things that my experience has taught me to rank as of at least equal importance with physical health, work, and play, are rest, leisure, and contemplation. So the items that I would include in my conception of a balanced life would be work, play, rest, leisure, contemplation and, last but not least, physical fitness." [It is significant that Dr. Riggs differentiates between play and leisure, rest and contemplation!]

"Each one of these may be considered a form of activity requiring a technique of its own. If these activities are in mutual equipoise and are pursued, each one, with intelligent technique, the result, according to my observations, is a balanced life, progressive, successful, and happy."

When we consider on the one hand, youthful emotions and the desires of youth for zestful living, and on the other, the conditions under which many young dietitians must work, perhaps it is not surprising that we find a large turnover in dietetic departments. The American Dietetic Association, however, can be an important factor in bettering these conditions. Four constructive studies might be undertaken:

1. A committee, might undertake to work out the personality requirements for the different phases of dietetic work—hospital, commercial, social service and research.

"What should a comprehensive size-up of an individual's ability include?

"Regardless of the type of work or the particular job a man is being selected for, there are five main factors which must be considered in gaining information about his ability, if an adequate judgment is to be arrived at. These five factors are:

"(1) *Physique.* This includes age, sex, height, weight, strength, sight, hearing, health, appearance, etc.

"(2) *Mental alertness.* This includes quickness of thinking, and mental adaptability.

"(3) *Skill.* This involves experience, and education, which includes trade ability and all acquired muscular and physical coördination.

"(4) *Aptitudes.* This refers to natural inclinations.

"(5) *Temperament.* This involves emotional make-up, attitude, honesty, willingness to assume responsibility, etc.

"A certain amount of each of these factors is required in the performance of every job, from the lowest to the highest, from ditch digging to the presidency of the United States. The amount of each varies, of course, for different jobs. In work requiring strength and physical endurance, for example, emphasis will be placed upon physique. However, even in this type of work, a certain amount of mental alertness, skill, aptitude, and temperament will also be required, and should be given consideration. In another job mental alertness or speed of thinking will be emphasized, but physique and the other factors will also be necessary. In fact, it may be said that for every type of work there is a maximum and a minimum requirement on each of these factors. If an individual possesses an amount within the range of the maximum and minimum requirements, his chances for successful performance will be good. If he possesses too much or too little, he will not be well adapted to the work."[1]

What are the maximum and minimum requirements for the successful practice of dietetics? We do not know. The Rochester Mechanics Institute has made a detailed and complete analysis of the dietitian's

[1] Personnel Service Bulletin, July, 1931.

work. Perhaps a committee could translate this study of operations into an analysis of the kind of ability necessary to perform the operations satisfactorily.

2. The second study that the Association might undertake would be to prepare a booklet describing the work of a dietitian. Before an individual knows whether or not she is interested in dietetics she must know what one actually has to do on the job. The booklet would be of value to vocational advisors and to high school and college teachers who advise students.

Perhaps this could be supplemented by interest or information tests, which could be worked out in coöperation with colleges; these would be useful in helping a young woman determine whether or not she is interested in the field of dietetics.

3. The Association can assist by directly helping colleges to anticipate the needs of the student about to take a position, by studying successful and unsuccessful student dietitians and showing in specific ways how training colleges can be made to function more adequately.
4. The last type of service is one that the Association has already under taken to some extent, that of assisting in educating the administrators of institutions that have a dietitian, or that are considering engaging one. It is a difficult and delicate undertaking. THE JOURNAL OF THE AMERICAN DIETETIC ASSOCIATION is a valuable asset, but it does not reach enough of those people that need to be educated. A study ought to be made of the best methods of organizing and operating a dietetic department. A booklet might be published pointing out the conditions that handicap a dietitian, and those that make for success.

The American Dietetic Association can be a powerful educational agent. Is it too ambitious to envisage a trained dietitian in every state and federal institution, children's home, and other organization that serves food? If not, we must continue to improve the quality of work done, and to remember that there are three places where the Association can render valuable assistance in helping to reduce the turnover among dietitians and to lessen the unsuccessful departments: one, by educating the public generally to a better understanding and appreciation of the work of the dietitian, specifically, by educating the executives of institutions employing dietitians; two, by coöperating further with nutrition departments in colleges, toward determining the kind of knowledge and

training that is most valuable (not by outlining courses and requirements so much as by giving specific kinds of information that are essential for the job); three, by helping to work out some method whereby individuals may be assisted to determine whether or not they are fitted for and interested in the work of the dietitian.

# EDITORIAL

## A Message from Dr. Martha Koehne

The names of the 1931–32 members of the Executive Committee of the American Dietetic Association appear elsewhere in the Journal. In the absence of an executive secretary, the retention each year of some members who are thoroughly familiar with the work of the national organization makes for greater continuity of policy and for more efficient management. We are most fortunate in having again, the services of those who were members of this group last year. It is hoped, however, that each year will bring new members into the committee, and this year we welcome Nelda Ross as treasurer, and Faith McAuley as chairman of the administration section. Both Dr. Daum and Miss Laird have served in previous years, but not recently.

At the meeting of the Executive Committee in Cincinnati, preceding the annual meeting, it was decided that the second vice-president should complete the history of the Association, so ably begun by Mary Barber. This will, therefore, be Miss Laird's responsibility. Future second vice-presidents will keep the history up to date. The two on the executive committee, who had served a year as president-elect, both agreed that the person so designated should, in the future, have a definite responsibility. Miss Boller, who was chairman this past year of the affiliation program, strongly recommended that this work be done by some member of the executive committee. This year we hope still further to strengthen the connection between the national association with its various section activities, and the affiliated state organizations. Our president-elect will assume this responsibility as the best way we could devise for enabling her to become directly familiar with all the activities of the association.

We are very happy to announce the continuation of Mary Pascoe Huddleson as editor of the Journal, and of Kathleen Lewis and Emma L. Feeney as associate editors.

## A Call for Wise Expenditure of Food Money

The reports of the White House Conference submitted during 1930 and 1931 revealed the startling fact that out of 45,000,000 children in this

country, 6,000,000 are improperly nourished. The reports also reveal, among other findings, that 383,000 of our children are tubercular, 850,000 are suspicious tubercular cases, and that about 95 per cent suffer from dental caries. Medical, nutritional, and other groups contributing to the health and well-being of children have been aroused as perhaps never before to the importance of nutrition for the protection of the children and parents of today and tomorrow.

The figures that may be revealed relating to malnutrition during the present year, and the far-reaching after effects of malnutrition for this year, are as yet unknown.

The vision shown by the American Dietetic Association in an effort to meet these serious problems is evidenced in part by the following resolution passed at the annual meeting:

WHEREAS, the vast problems of malnutrition, of emergency feeding of families and large groups of men, women and children and the necessity for the most efficient expenditure of funds provided for relief, during the present unemployment situation, are matters of deep concern,

*Be it resolved*, That the American Dietetic Association hereby offers the services of its members to the President's Unemployment Relief Committee, and to state, county and community groups responsible for relief, suggesting that effective coöperation may be secured through the enrolled dietitians of the American National Red Cross and the members of state and local branches of the American Dietetic Association.

Among activities that may be undertaken by members of the Association to help meet food problems during the unemployment period are the following:

1. Immediate visits to the proper local group by members of the Association and the offering of their services to help with food and nutrition work carried on or needed in order to safeguard nutrition and to spend food money to the best advantage.
2. Discussion with the local group of the importance of developing the best possible program to safeguard the nutrition of the community.
3. The preparation by members of the Association of food budgets for families of low incomes or dependent families, as well as for families of moderate or high incomes.
4. The preparation by members of the Association of menus and recipes adapted to the local situation and built around the budget suggested for families of low incomes or dependent families, as well as for families of moderate and high incomes.

5. The holding of consultation hours at some central place for those needing special help on budgets—especially food budgets.

6. The teaching of groups that are needing instruction in foods. If qualified, through teaching the Red Cross food and nutrition course.

7. The study of the nutrition situation and needs in the community, and encouraging the appointment of a Red Cross chapter nutrition committee to work with members of the American Dietetic Association in the local community to help bring in a Red Cross nutritionist who can give full time to meeting nutrition problems.

As individual members of the Association, we can do much by carrying on these and other activities and by getting together the trained group—dietitians, nutritionists and other home economists trained in food and nutrition—and by organizing them into a volunteer squad to offer their services at definite times to the local relief group. Thus we can meet the challenge presented to us by the resolution passed by the Association.

## Facts and Foibles

The past is full of the graveyards of theories and aids to mankind that have been tried and found wanting. It is axiomatic that all advancements must pass through a period of skepticism and trial before their acceptance as boons to humanity. The science of nutrition, adopted with enthusiasm by its qualified adherents, and with slightly too much vim by certain uninformed persons anxious to ride in the band-wagon, has recently become the happy hunting ground for wits and near wits who find calories and vitamins good targets for their play. Members of the ultra-conservative or grandfather school of eating can see no good reason for newfangled ideas in feeding. These resignedly accept their xerophthalmias and other nutritional disorders as dispensations of Providence; those seek an audience responsive to a laugh.

Criticism, whether deriding or reactionary, should be stimulating when its mark has a firm foundation. Much of this resentment has been awakened in conservative minds by the exaggerated statements and claims of advertisers and the radio messages of an army of quacks. The situation is well summarized by Wilder:[1] "the profession (medical) is acquiring an antipathy to the subject of diet therapy, and many physicians, even some who know better, have been goaded into the display of actual hostility. The idea that ordinary, everyday folks are in any danger of vitamin or other deficiency is ridiculed; the increasingly probable condition of mild

[1] Wilder, Russel M.: The significance of diet in treatment. J. A. M. A. 97: 435 (Aug. 15) 1931.

or incipient avitaminosis is rejected before the evidence is examined; the conclusions of the serious students of nutrition are ignored, and dietitians are denounced because of their efforts to put these principles into practice." Fortunate, indeed, is it that most patients store enough vitamins to tide them over a few weeks' semistarvation during an acute illness. Dietary considerations may often be ignored over a short space of time. But what of the chronic illnesses—the ulcer case with its questionable diet quota of vitamin C, and its increased demands on adequate diet to heal lesions present? What of the rigid restriction of protein in nephritis and the resulting intensified nephritic edema; the method of treating the disease rather than the patient, in diabetes; the faulty administration of the ketogenic diet in epilepsy with its disregard of normal requirements; and the amusing, yet tragic "reduction" methods in vogue?

As Wilder says, "the importance of diet in the management of pregnancy, anemia, febrile diseases, tuberculosis, arthritis and the degenerative disorders is no less than in the conditions referred to. In many diseases the possibilities of therapeutic benefit from supplying nutritional elements in amounts greater than those required for maintenance in health is today receiving augmented attention." Thus the way seems clear toward greater attention to this important field of dietary therapeutics, a better understanding of the quantitative features of dietetics on the part of the practitioner, and more and better instruction in nutrition by medical schools.

## Professional Ethics and Publicity

Recently the New York Academy of Medicine and the Medical Society of the County of New York went on record in setting forth the principles governing the conduct of physicians with the public through the press, lecture platform, lay periodicals and the radio. Activated by a desire to be in accordance with medical traditions and that code of ethics, protecting the public as well as the physician, a working set of principles has been prepared. In view of the demands now being made on members of the dietetic profession to send out cheering food news over the ether and through other channels, a summary of these principles, many of which are applicable to allied professions, seems timely:

*Publicity.* The use of a physician's name should be confined to public notice of events which constitute legitimate news, rather than featuring the comings and goings, the connections, achievements and honors of an individual.

*Propaganda* has for its main objectives the arousing of public interest in supporting and acting on health matters. Emphasis is placed on some matter of public health interest and only incidentally upon the physician connected with it.

*Public Health Education.* Statements concerning this subject are given impressiveness and authoritativeness when emanating from a representative physician or an official medical body. The speaker serves merely as a mouth piece, through which is expressed a fact universally agreed upon by physicians.

*Radio Broadcasting.* Anonymity on the radio is incongruous. This problem may be met without violence to good taste or ethical procedure. The speaker may be announced as "Dr. John Jones, Clinical Professor of Medicine at X. Y. Z. University" not necessarily as an "internationally famous authority, etc." The radio speaker brings to the public the fruits of many men's labors. His personal interests and individual convictions should be introduced through other channels provided for the advancement of a physician's medical ideas. It is desirable that radio talks should be given under the auspices of designated committees of the authoritative professional groups. Provided that commercial organizations are in good standing, there is no objection to physicians broadcasting health information for them on their time, taking care not to make the address an endorsement or testimonial for the product of the organization on whose time the broadcast is given. When such employment is offered, a physician should confer with the Medical Information Bureau, both as to the standing of the commercial organization and the contents of the paper he proposes to broadcast.

*Magazines and Periodicals.* Articles written by physicians on medical topics affecting the profession should be subject to preview by the local medical organization.

# ASSOCIATION REPORTS*

## Report of President

As President of this Association, I would like to discuss with you the work of the Association this past year and to add a few suggestions for future policies. The reports which will follow demonstrate that there has been steady growth and progress during the year. In the belief that the function of this organization is to be the agency through which members may do collectively what cannot be done individually, concerted effort has been made to make provision for every chairman and committee to realize their aims, and through combined energies we have tried to crystallize all the greatness and strength of our Association into substantial progress and achievement.

At the mid year meeting of the Executive Board the following plans were outlined:

(1) A policy of economy was decided upon in order that we might close our fiscal year in a satisfactory financial condition. Our budget at that time indicated a shortage of about $1000. Each member of the Executive Board and committee coöperated by having as much secretarial work as possible taken care of in the central office. This had a far reaching benefit, and through this centralization of work the business manager was able to have better contact with the activities of the Association.

(2) It was voted that in June, 1932, if sufficient funds could be provided, the bi-monthly Journal should begin with Vol. 8, No. 1.

(3) Plans were made for the completion of the personal inspection of hospital training courses for dietitians.

(4) It was voted that the hours of the Executive Board meetings at the annual meeting be so arranged that members of the Board could attend convention meetings, and that arrangements be made for the Executive Board to be available to the membership at specified hours during the convention.

(5) Plans were made for a study of the scope of the Social Service Section and to suggest, if feasible, a change of name.

* Read before the Annual Business Meeting, Cincinnati, October 19, 1931. Certain papers and reports presented at the Sections will appear in later issues of the Journal.

Throughout the year our financial condition has steadily improved. A new classification of accounts has been made which has proved enlightening and exceedingly helpful. Our more stable financial condition will make possible the realization of the bi-monthly JOURNAL. The last two JOURNAL issues have been self maintaining. The central office has initiated an activity sheet which concisely records the work of the business office each month.

This year a letter to each new member, explaining the activities of the Association and asking for a signification of interest, has been of assistance in classifying our membership as to section interest.

Continuity is growing in our sections, and each year there is more unification of work. Our section chairmen carry on the constructive work of the Association, and this year each chairman has definitely aimed to further any piece of work started, and in addition some most interesting studies have been initiated.

The phrase, "with a major in Foods and Nutrition" as given in our constitution under Membership, Section 2, Article III, should be clearly defined.

The history of the Association has been written to date. I would like to suggest that the policy of having the Second Vice-President carry this responsibility be continued.

The JOURNAL of our Association has continued this year to reflect the high standards of our Editor. I suggest that the duties and work of our Journal Board be more specifically defined in order to assure the Editor the greatest assistance from its members.

The affiliation program has progressed. As time goes on I would like to see the strength of the state associations felt in our organization. Our national Association should reflect the needs of the state affiliated groups, and these groups should have representation on our Executive Board. It occurs to me that it might be possible to assign to the First Vice-President the responsibility of making the contacts between the state associations and national Association. Until we have an executive secretary, some means must be provided for knowing through the state associations the individual needs of our members.

This is the first year you have had a President who has served as President-Elect. I would like to emphasize the importance of the President-Elect's sharing the responsibilities and working very closely with the President. This is the only method by which this type of administration will be successful. Otherwise, until we have an executive secretary, our Association will suffer from too rapid change of policies.

Your President would like to close these remarks with an expression of deep appreciation to the Executive Board and individual members for their coöperation and loyalty this year.

S. MARGARET GILLAM.

## REPORT OF THE SECRETARY

As secretary of the American Dietetic Association, likewise chairman of the Membership Committee, I wish to submit the following report:

It has been my pleasure to have had Mrs. Ruth Cooley Baumhoff and Miss Elizabeth Hennecke as members with me on this Committee, and I wish to express to them my appreciation for their excellent coöperation.

During the past year there have been 498 new members accepted into the Association; 150 transfers from junior to active membership; 11 reinstatements; 66 resignations; two deaths; and 75 have been dropped, making our present total membership, 2,121.

The expenses of the secretary and chairman of the Membership Committee are as follows:

| | |
|---|---|
| Clerical assistance | $77.95 |
| Postage | 44.84 |
| Total | $122.79 |

During the past year there have been several state associations to affiliate with the National Association. Miss Boller, as chairman of the Committee on state affiliation, included the names of these Associations in her report.

I have enjoyed the privilege of serving you for the past two years and wish to extend my sincere thanks to the Membership Committee; to the business office; and to all those of you who have given me your earnest coöperation.

PHYLLIS DAWSON ROWE.

## REPORT OF ADMINISTRATION SECTION CHAIRMAN

In reviewing some of the records of the Section we realize how much has been done to set standards and determine what our accomplishments are, while stressing the need for greater effort to gain the efficiency to be expected of any profession as it becomes established.

The work of the past year has included:

1. Mailing list of members primarily interested in the work of this Section.

2. Further work on personnel study, Rose T. Baker, Chairman.
3. Study of food purchase and cost, Frances B. Floore, Chairman.
4. Compilation of bibliography on administrative problems, Minerva Harbage, Chairman.
5. Study of equipment to determine standards, Mabel G. Supplee, Chairman.
6. Study of affiliation contacts with allied groups, Mary M. Harrington, Chairman.

The following members have served as Consultants:

Ruth Atwater—Canned foods.

Arnold Shircliffe—Large quantity recipes.

Mabel G. Flanley—Work of the dietitian in foreign countries.

I wish to thank our President, officers, Business Manager and fellow Section Chairmen and Miss Cooper, my predecessor. To my Committee Chairmen, I express deep appreciation for their untiring work in contributing reports. In closing, the aim of the Section has been to study methods and determine standards by which the work of the administrative dietitian shall be of greater value to our own and kindred professional groups.

HELEN E. GILSON.

## REPORT OF DIET THERAPY SECTION CHAIRMAN

At the Diet Therapy Section dinner reports were presented of the projects which have been carried on by the various committees during the past year. The first of these as outlined by Martha Davis last year aims to:

1. Collect a library of original sources of food composition.
2. Summarize and evaluate the methods used.
3. Study the factors which may affect the estimation of the physiological values of food as distinguished from the data obtained by purely analytical methods such as:
   a. Utilization of carbohydrate as it is affected by the percentage of accompanying cellulose.
   b. Error involved in estimating protein from the non-protein as well as protein nitrogen.
   c. Coefficients of digestibilty of protein and fat as influenced by methods of preparation, and the type of accompanying food.

Dr. Helen Mitchell's Committee is collecting and evaluating the methods which have been used in determining mineral values of foods. Substantial progress has been made with the iron question by Dr. Mit-

chell's laboratory while Dr. Helen Hunscher and Dr. Roe Remington have consented to undertake the calcium, phosphorus, and iodine studies respectively. This most ambitious and fundamental study is one that will undoubtedly extend over a period of years, one that is a distinction for our Association to sponsor.

Mary Foley of the Kahler Corporation, Rochester, Minnesota, has been chairman of the committee testing in practice the case study form developed by Miss Ross and Miss Anderson the previous year. A new outline was presented, embodying the changes proposed by the committee, and further suggestions were brought out in the discussion. Miss Foley's committee will continue working on the outline this coming year, and will appreciate both suggestions and volunteers.

Genevieve Cartmill, University Hospital, Ann Arbor, Michigan, has continued the work of Mary Harrington's committee of last year in the collection of calculated recipes. The percentage composition is based on the weight of the cooked product (an average of at least three preparations being used) under uniform conditions of temperature, time, and method.

Grace Bulman of the Veterans' Bureau and her committee have collected the routine hospital diets from sixty-five Class A hospitals in various parts of the country, together with physicians' statements concerning the conditions for which the diets are prescribed. These show a wide variation as to nomenclature and type of foods included. These and further compilations will be studied this year with the hope of presenting an outline that the Association may sponsor.

The committees studying the nutritional adequacy of the Reduction Diet with Elizabeth Hayward, Cottage Hospital, Santa Barbara, California as chairman, the Ulcer Diet with Lute Troutt of the University of Indiana Hospitals, Indianapolis, Indiana as chairman, the Nephritic Diet with Sister Mary Victor of St. Mary's Hospital, Rochester, Minnesota, as chairman, presented reports which were interesting and arresting. These will be given in full in a subsequent issue of the JOURNAL.

The Section plans for the coming year to continue working on the following problems:

1. Collection of data dealing with food analysis and the factors affecting its interpretation.
2. Case study outline.
3. Collection of calculated recipes.
4. Routine hospital diets.

To initiate the following studies:

1. Nutritional adequacy of diabetic diets for adults.
2. Nutritional adequacy of diabetic diets for children.
3. Methods of calculating diabetic diets with a comparison of the errors inherent in each.
4. Survey of current practices in infant feeding.
5. Nomenclature and nutritional adequacy of diets restricted in residue.

MRS. DOROTHY STEWART WALLER.

REPORT OF THE EDUCATION SECTION CHAIRMAN

The activities of the Section during this year have been six-fold:

1. Library exhibit renewed and enlarged under the direction of Sarah Elkin, Mandel Clinic, Michael Reese Hospital, Chicago, Illinois. Material available on request at the Association Office, 25 East Washington Street, Chicago, Illinois.
2. Inspection of courses for student dietitians in hospitals applying for registration on the approved list of the American Dietetic Association. Sixty-six courses have been inspected and approved. The inspection has been directed by Mrs. Ruth Cooley Baumhoff, University City, Missouri. Copies of this list, may be secured through the Association Office.
3. Recommendations for academic training of students planning to become student dietitians. Questionnaires relative to the courses considered desirable for students looking forward to hospital dietetics were sent to directors of dietary departments in all hospitals offering approved courses for training student dietitians. From replies to these questionnaires a minimum list of subjects was suggested. It was approved by the Association at the Section meeting, October 21st, and will be used as a basis for enlisting the coöperation of home economics departments during the coming year. Chairman, Nelda Ross, Presbyterian Hospital, New York City. A list of colleges offering satisfactory academic preparation for student dietitians since 1928 is incorporated in this report, available on request at the Association Office.
4. Training of medical students in nutrition and diet therapy. A study of typical procedures has been made under the direction of Fairfax Proudfit, Instructor in Nutrition and Diet Therapy, University of Tennessee Medical College, Memphis, Tennessee.

5. Revision of teaching outline for nurses. Suggestions for the revision of the teaching outline for nurses, accepted by the Association in 1930, are being compiled under the direction of Professor Ethel M. Thompson, Western Reserve University, Cleveland, Ohio.
6. Content of a major in foods and nutrition as offered in college courses. A study of the requirements of courses and prerequisites for a major in foods and nutrition in all colleges offering home economics courses toward the Bachelor's degree is being conducted by Professor Jessamine Williams, Oregon State Agricultural College, Corvallis, Oregon. This report on completion will be acted upon by the Executive Committee and referred for use to the Membership Committee.

MARY DE GARMO BRYAN.

REPORT OF THE SOCIAL SERVICE SECTION CHAIRMAN

This year the Social Service Section has tried to build another story to the structure whose foundation was laid some four years ago. From the membership cards returned to the Chicago office, there were 147 persons who signified an interest in this Section. Some of these members were at work in food clinics, child welfare associations, schools, the Red Cross or colleges. In consequence, there have been eight committees at work. A summary of their work and suggestions for future work follows:

*1. Committee on Child Health: Anna DePlanter Bowes, Chairman*

In planning the program for this Section it was suggested that the topic of child health be incorporated this year for the following reasons:

1. It is generally recognized that every member of the Association is daily influencing child health by her attitudes, practices, and teaching about food and nutrition no matter where her sphere of activity lies.

2. An increasing number of our members are now engaged in full time or part time child health activities. Information on this topic is therefore of interest and concern to all of us as an aid to our best professional service.

The committee on child health feels that one of its greatest contributions is to direct your attention to the printed materials of the White House Conference that are most pertinent to the work of the dietitian.

The most helpful of these publications for us are (1) a volume on Nutrition, prepared by the Committee on Growth and Development. Up to date summaries and excellent bibliographies on all dietary essen-

tials for normal nutrition and the scientific and practical aspects of child feeding are included. These summaries have been prepared by outstanding nutrition research workers such as Rose, Roberts, Sherman, McCollum, and Mendel, and physicians such as Hess, and Aldrich.

For the first time in the history of nutrition we have in this volume a statement of facts on which there is unanimous agreement between nutrition research workers and physicians.

(2) The second publication of special interest to dietitians is the report of the sub-committee on The Nutritionist in the Health Program. In the preparation of this report Miss Gillett and her committee surveyed what is being done, by home economics trained women, in hospitals, in clinics, and all other organizations employing full time dietitians or nutritionists for child health work. In the appendix of this report about twenty members of this Association have given a detailed account of their work as carried out in their respective hospital, dispensary, health center, or health agency.

To determine the needs of the members of the Association engaged primarily in child health work, questionnaires were sent to each person expressing interest in this field. The questions were limited to the present type of work being done in the prenatal, postnatal, and preschool periods—what the difficulties were and suggestions as to how the Association could help in their problems.

A summary of the points made follows:

1. Very little nutrition work is being done with expectant mothers.

2. The greatest difficulties encountered in nutrition work for the preschool child are lack of adequate workers; lack of sufficient funds for proper food; lack of understanding on the part of the parents of the importance of various factors in good nutrition; the need of reliable illustrative and printed material giving correct facts on food and nutrition in simple language.

The greatest handicaps to progress in child health work as expressed by members attending the breakfast conference are:

1. Inadequate emphasis in schools of home economics and hospital training courses for dietitians on the economic aspects of food and family nutrition.

2. Lack of experience and contact with work in social service agencies.

3. It was also brought out that dietitians could increase the effectiveness of the physician and the nurse in community health work if special attention and emphasis were given to teaching medical and nursing students: (*a*) a better appreciation of the importance of good nutrition

and normal diet to health at all ages; (*b*) more practical facts about food and meal planning with families on different income levels.

In discussing possible activities of this committee in the coming year the committee suggests:

1. That the American Dietetic Association coöperate with the Follow-up Program of the White House Conference through local and State organizations. Progress in child health should be reported, citing outstanding pieces of work being carried on in various communities.

2. That new studies or research, illustrative or teaching material on child health be made available to all members.

3. That members of the American Dietetic Association coöperate with existing agencies in their local communities in the present urgent unemployment situation through disseminating correct information on low cost foods, proper cookery and budget facts so that both child and adult health may be protected.

*2. Committee on School Health, Vera M. Stemple, Chairman*

An inquiry from a teacher in the Cleveland schools asking for information regarding the feeding of indigent children in schools suggested the work of this committee. Three hundred and twenty-five questionnaires were sent to as many cities. One hundred and two were returned. The questionnaire included questions as follows:

(a) Approximate number of indigent children in schools.
(b) How determined.
(c) How cared for.
(d) How food service was organized.
(e) How financed.
(f) Type of food furnished.

A summary has been made of this information. If your community wishes to organize work of this kind this winter, a copy of the report may be had by writing the Chicago office or the Chairman of the Section.

In studying the mailing list of the twenty-two members of the Association to whom we sent a letter asking for suggestions, we found thirteen in high schools and nine in dormitories. Knowing that there are many dormitories and schools with dietitians in charge of dining rooms and cafeterias, we are planning a drive for more members.

We plan to bring to the attention of school officials during the coming year the advantages of having a trained person in charge of such important work as the school lunch and dining rooms of dormitories.

Education along the line of food combinations is being carried on in certain school cafeterias. The committee plans, also, to assemble such

material as is used in this work, classify it, and make it available to those having similar responsibilities. Our aim for next year is to "Teach Health to Those Whom We Feed."

*3. Health Work with Adults, Claudia Gilbreath, Chairman*

It was decided that the will of the general committee could better be obtained by a questionnaire giving those that had expressed an interest in this particular field an opportunity to voice their needs.

1. Is there a need for courses of study to help you in doing adult work with:
   a. Those of limited education?
   b. Those of high school or college education?
   c. Hospital student nurses?
   d. Social workers?
   e. Teachers?
   f. Mothers?
   g. Industrial workers?
2. Is there a need for better follow-up methods?
3. Is there a need for better illustrative material?
4. What do you think of awards? Any need for them?
5. Do you need a nutritionist to do adult work in your community?
6. Is there need for some information as to how to finance this worker?
7. Do you need help in better coöperation with other agencies in your community?

Out of 24 questionnaires sent out eleven were returned. Ten checked that they were interested and felt there was a need in courses of study for people of limited education; seven expressed the same feeling as to courses of study for high school and college education; five for student nurses; seven for social workers; eight for teachers; nine for mothers; five for industrial workers; ten felt that help was needed in better follow-up methods in our work with adults; eight felt the need of illustrative material; six were interested in awards; six in how to improve coöperation with other agencies; one checked everything.

Out of the eight questionnaires returned, six said they would contribute. We immediately followed this with a letter asking for this contribution and four out of the six did contribute; one sent an outline course of study for people of limited education; one sent a very full outline course of study for teachers; one for high school pupils; one sent lesson plans for the small child. This was turned over to the Committee doing that phase of the work.

Since there had been interest and need expressed in the questionnaire, it is planned to take the contributions sent to us in the form of courses of studies for different groups and develop them, later bringing these courses of study to the convention next year for discussion.

*4. Food Clinic Teaching, Gertrude Spitz, Chairman*

During the year an outline relating to the teaching of patients in food clinics was sent to members enrolled in the Social Service Section, asking them to describe their method of prescribing the diet, whether printed or adjusted to the individual patient, the material they used in teaching the diet, food exhibits, wax models, pictures, printed material, and to send a list of such material. Factors of significance in the teaching of patients were checked for study next year. These included (1) place for teaching patient, (2) routine of referred patient, (3) background in terms of home environment, economic status, nationality, mentality and nutritional history, (4) preparation of dietitian for out-patient work.

It was brought out that most of the teaching was individual and that a room to which the patient could be referred was essential. Some group work was carried on, but rather as an informal social event supplementing the individual method. In one hospital the patient was seen jointly with the physician. The time allotted to this teaching of the new patient was at least one-half hour. So much information was requested in regard to organization of food clinics that it is proposed this year to study:

A. Procedures and methods in food clinics and out-patient departments.
   I. Organization:
      a. Compilation and evaluation of forms.
      b. Personnel.
      c. Routine (policy book).
   II. Teaching methods and procedures in out-patient departments. (For this we need the coöperation of the administrative dietitian).
      a. Clientèle.
      b. Methods.
   III. Training of the out-patient dietitian. (A coöperative project with the Education Section.)
      a. Training of workers already in the field (this to be obtained from available data).
      b. Present training being offered.
      c. Statement of needs.

B. Bibliographies.
   a. Foods for the foreign born.
   b. Material for health workers.
C. Compilation of diet costs. (In coöperation with welfare agencies.)
   a. Normal.
   b. Therapeutic.
D. Use of case study forms of the Diet Therapy Section in out-patient work. (This project to be carried on with the coöperation of the Diet Therapy Section.)
E. Evaluation of courses offered by health centers, food clinics, and community organizations to public health nurses, social workers, and dietitians. (In coöperation with Education Section and Child Health Committee.)

Those interested in any of these subjects are requested to write the chairman.

*5. Commercial People Interested in Nutrition, Lillian B. Storms, Chairman*

The American Dietetic Association has considerably broadened the scope of its interests since its organization. While the majority of its members are hospital and institution dietitians, there are many others with allied interests who have transferred from the college to commercial work. The possibilities of contributions of the business world members to the other members of the Association, and on the other hand the possible contributions of these other members to our work in the business field, activated the formation of this committee. At the same time, Edith Barber was asked to act as chairman for those interested in the interpretation of nutrition findings in various magazines and newspapers. It was found that many of the same people were included in our two groups. Therefore, we decided to unite the two groups as one unit in the section on Social Service. After discussion of our objectives we tentatively chose the name of the Committee on Popular Nutrition Publications as a temporary name.

Nutrition research is being interpreted to the public in various ways from the printed page, often through newspapers. You may not read these articles, but those in your community do. Can you not interest yourself in them, and if satisfactory, tell your local editor so; if not, cannot you secure an interview with the editor in charge and suggest some of the material available which is of excellent character? Another subject considered was that of your own sources of information. Where are you getting your current nutritional information?

Are you using the women's magazines and the popular or semi-popular magazines. Many of the articles appearing are written by leading nutritionists. Which are you using as reference for your students—nurses, dietitians, college students in nutrition, or medical students? Have you any recommendations to make to these writers and editors?

Among the booklets available from commercial firms, the exhibitors at our annual convention, and from the advertisers in the JOURNAL, there is much valuable material. Many of these firms have trained home economists, or trained dietitians on their staffs. They have information on their products and are glad to supply it to you. Is it what you want and in the form you want?

Another possibility which suggests itself is coöperation between institutions, such as hospitals, with the facilities for making studies of equipment, for instance, and firms who would be glad to finance worthwhile studies.

We questioned if material which is available could be made known to you in some more efficient way. There are compiled lists of the available literature and charts. An excellent article along this line appeared in the Journal in June on some sources of illustrative health material of use to the hospital dietitian. Are you using that list and are the other lists published elsewhere from time to time of use to you? Could we assist along these lines?

*6. Nutrition and Journalism, Edith M. Barber, Chairman*

A letter was sent to a group of persons concerned with the interpretation of nutrition findings in print, asking them to plan to attend a breakfast to be held during the convention for discussion of this subject.

Before the convention, Miss Storms and I found that our lists overlapped and that it would be wisdom to combine the discussion groups for the breakfast. Miss Storms brought up the subject of commercial relations to nutrition and the discussion showed that the problem was concerned chiefly with the interpretation of nutrition findings in print—the subject which was the excuse for the formation of the committee which I was heading. It was therefore decided to continue the two groups and the recommendations of the meeting have been continued in the report given by Miss Storms.

*7. Public Health Programs, Alberta B. Childs, Chairman*

Letters were sent to public health organizations including food clinics, public schools and child health organizations asking for:

1. A detailed outline of the programs
2. Records used
3. A bibliography of material found useful in teaching, where it could be procured, and at what cost

This material will be filed in the Chicago office. A compilation of illustrative material was not made, because it was felt that the committees concerned with the work of these various organizations should be concerned also with the teaching material found useful to them. It is the recommendation of this committee that it not be continued another year, but that the project become a part of the work of the committees on food clinics, public schools and public health organizations.

*8. Shall We Rename the Section? Mary I. Barber, Chairman*

Our history tells us that for some years there has been discussion as to whether:

1. The Social Service Section was correctly named.
2. Whether it should function as a section or whether the members' interests lie within the other sections.

A form letter was sent to all the members of the Association classified as Social Service asking for an expression of opinion and suggestions for a new name.

At present there are 14 child health workers; 18 nutrition workers with adults; 29 nutrition workers in hospital clinics, out patient departments, etc; 41 managers of lunchrooms in schools, etc.; 45 consultants in commercial fields in this section. Fifty-three were in favor of renaming the section; 4 opposed. There were almost as many names suggested as there were votes. The report was brought before the Executive Board. One member proposed that it be called the Community Education Section and that the present Education Section be called the Professional Education Section. This met with unanimous approval and a recommendation was made to the joint sections at their dinner meeting Wednesday evening which will be brought before the revisions committee to have the name of the Social Service Section changed to Community Education Section, and that of the Education Section to Professional Education Section.

## Report of the Journal Editor

Referring to the Treasurer's report of the Journal finances to date we find a very gratifying situation. With the development of a bi-monthly in 1932 the demands on the time of the editor and the business manager, and the expenses, will be greater. Our progress to the status of a monthly will depend on the response to the bi-monthly.

Practically all periodicals are financed chiefly through advertising. Potential advertisers are influenced primarily by the general character of a journal, and the make-up of its subscription list. All advertising prospects for the JOURNAL must meet the rigorous approval of the Investigating Committee of the Association. This fact is a safeguard in buying from our advertisers. Members can show their loyalty to the Association and benefit themselves by patronizing our advertisers and by letting them know that their advertisements in the JOURNAL are read. Business firms after placing a contract, usually decide to renew it only if they receive sufficient response. Unless the JOURNAL is mentioned in writing them they will not be able to give us proper credit. Coupons are available, with key letters denoting the publication, so that readers may fill them out and receive authentic information to assist them in their work. The advertising manager will determine the success of his advertisement solely by the response from this source.

There are other matters concerning the JOURNAL of interest to members. We do not publish papers that have appeared in other journals and we assume that papers read before the Association are to be submitted as a matter of course for publication in the JOURNAL. Papers read before local affiliated groups, if suitable for publication, should be submitted first to the JOURNAL editor. Members at all times are expected to demonstrate their loyalty to the Association and the JOURNAL by constant effort in their behalf. The JOURNAL is possibly our best medium for expressing the interests and advancements of our profession; aside from this value as a publicity agent with the allied professions, it can be of the greatest help to our members only if each individual is constantly on the alert to help push. We constantly need helpful papers on administrative problems.

I should like to take this opportunity to thank all those members who have so generously assisted the past year by gathering and promptly sending in copy and news notes for the JOURNAL. I wish especially to thank your President, Miss Gillam, Dr. Koehne, and Miss Smith, the first Editor of the JOURNAL, for their constant encouragement and assistance, and Dr. Bryan, who near at hand in New York always patiently listens and guides the JOURNAL. Kathleen Lewis has continued her one-man job of grinding out easily assimilated bits of current literature pabulum; Emma Feeney is continuing her helpful publicity work, and collecting and soliciting papers. Their only reward is your appreciation and loyalty to the JOURNAL.

MARY PASCOE HUDDLESON.

# CURRENT LITERATURE

KATHLEEN M. LEWIS

## American Journal of Diseases of Children

*Vol. 42, July, 1931*

*Viosterol and cod liver oil: comparative observations. E. O. Prattier, M. Nelson and A. R. Bliss.—p. 52.

Mineral metabolism in late rickets. G. Stearns, M. J. Oelke and J. D. Boyd.

*Vol. 42, August, 1931*

*Effects of deficiency in vitamins in infancy: caries of the teeth and vitamins. C. E. Bloch.—p. 263.

Plasma proteins and edema: their relationship in a group of children presenting the nephrotic syndrome. J. K. Calvin and A. H. Goldberg.—p. 314.

*Vol. 42, September, 1931*

*Human milk studies. Chemical analysis of milk representative of the entire first & last halves of the nursing period. I. G. Macy, B. Nims, M. Brown and H. A. Hunscher.—p. 569.

*Viosterol and cod liver oil: comparative observations.* Prather, Nelson and Bliss made a series of experiments on rats using a purified diet adequate in proteins, inorganic salts, calories and vitamin B. One group received the plain ration, another group the plain ration plus ½ drop viosterol, and the last group the plain ration plus ½ drop cod liver oil daily. The animals in the first two groups developed all the symptoms of a deficiency in vitamin A. The last group, which received cod liver oil, did not show abnormalities.

Viosterol does not have the power to stimulate growth and development of the body or to prevent infection of the upper respiratory tract or to produce the same degree of calcification and growth of bones as does cod liver oil. Therefore since colds, malnutrition and intestinal inadequacies are more frequent in children than rickets the substitution of viosterol in the diet for cod liver oil is not logical.

*Effects of deficiency in vitamins in infancy: caries of the teeth and vitamins.* Deficiency of vitamin D is considered to be one of the chief causes of rickets and tetany, as well as xerophthalmia and the development of caries of the teeth. Vitamin A is of special importance in the resisting and overcoming of infection. Results from two state schools show that a high percentage of blindness was due to xerophthalmia, resulting from lack of vitamin D. When growth is inhibited, due to deficiency in vitamin A, the deficit is not only counterbalanced, but is made up when foods rich in this vitamin are fed. Lack of vitamin A does not give rise to rickets, but might give rise to dental anomalies during the formation and calcification of teeth.

*Human milk studies. Chemical analysis of milk representative of the entire first and last halves of the nursing periods.* Individuality exists in the composition of human milk, the quality and quantity of milk varying under physical, chemical and psychic conditions. The formation of milk is most active immediately after milking and diminishes as the pressure of milk stored interferes with cellular activity.

By analysis, lacteal fat increased from beginning to end of nursing from six to seventy-nine per cent. Increase in fat, total solids and nitrogen, observed in later part of milking, is due to pressure interfering with activity. These changes were not influenced by the baby at the breast. It has been shown that definite ratios between various constituents in the milk are of importance. Those ratios with the progression of nursing may approach abnormal values in some cases. We are led to conclude from the inconstancy of ratios between certain milk constituents that certain components are controlled by different secretory mechanisms.

**American Journal of Physiology**

*Vol. 98, August, 1931*

Restoration of the pancreatic secretion by peptone and histamine. M. E. MacKay and S. G. Baxter. —p. 42.

A comparison of the effects of acid-base changes upon respiratory movements and the response of muscle to direct, indirect and reflex stimulation. H. Gay.—p. 60.

The "excess respiratory quotient" of the recovery period following strenuous muscular exercise in man. C. L. Gemmill.—p. 135.

*The relationship between food and water intake in mice. F. C. Bing and L. B. Mendel.—p. 169.

*Vol. 98, September, 1931*

*On the relation of blood sugar to blood volume, and carbohydrate to water retention. J. F. McClendon.—p. 216.

*The effect of different per cents of protein in the diet. Life span and cause of death. J. R. Slonaker. —p. 266.

*Blood sugar, urine sugar and urine protein in exercise. H. T. Edwards, T. K. Richards and D. B. Dell.—p. 352.

*The relationship between food and water intakes in mice.* Reports have been made that mice supplied with air-dried foods can thrive without drinking. On dry foods mice can live, reproduce and rear one or two in each litter. The mouse does not rely on evaporation to regulate body temperature; and with the deprivation of water, the body temperature drops and the consumption of food decreases, eventually resulting in death. The ratio of water intake to food consumption is constant, 1 cc. of water for every gram of food.

*On the relation of blood sugar to blood volume, and carbohydrate to water retention.* Experiments show that during fasting and thirsting, there is no significant change in blood sugar, but an increase in blood volume. Normal men when fasted, but given water, showed that there are only small changes in blood sugar and blood volume. If glucose is contained in the water, both the blood volume and water retention increase. Therefore the ingestion of carbohydrate increases water retention.

*The effect of different per cents of protein in the diet. Life span and cause of death.* Five groups (1), (2), (3), (4), and (5) of rats (eighteen pairs of rats in each group) were fed throughout life on diets containing 10, 14, 18, 22 and 26 per cent protein respectively in their diets. The greatest average maximal weight and the greatest average spontaneous activity were attained on the 14 per cent protein diet and the lowest on the 26 per cent. Also the highest per cent of fertility in both sexes was found in group (2) and the lowest in group (5).

During the entire reproductive period, those rats in group (2) had the longest reproductive span, a larger average number and size of litter, and lower mortality of their nursing young. Next to group (2) were group (1), (3), (4) and (5) respectively.

The best growth of the young during the lactation period was attained on the higher per cent protein diets, and the loss of weight of the mothers during the period became less as the per cent of the protein in the diet increased.

The average life span from the longest to the shortest in both sexes was in order of group (2), (3), (1), (4), and (5).

*Blood sugar, urine sugar and urine protein in exercise.* Normal concentration of the sugar in blood is usually expressed as 95 to 100 mg. per 100 cc. The work of Edwards, Richards and Dill during the 1930 season on "varsity" and substitute foot ball players, clearly shows that strenuous exercise causes an increase in blood sugar; if it continues until nearly exhausted hypoglycemia might result.

An average increase in blood sugar among "varsity" football players is from 100 mg. to 159 mg. per 100 cc., although one player reached as high as 244 mg. per 100 cc. in mid game. At the end of the game, the blood sugar may be normal, but the urine sugar is high. If exercise were to continue, as in marathon races, the blood sugar would decrease and when near exhaustion may be 53 mg. per 100 cc. of blood. This is caused by a depletion of carbohydrate reserve.

Protein in the urine is definitely related to length and amount of exercise. It commonly appears in the urine of the football players, increasing in concentration as play continues.

## American Journal of Public Health

*Vol. 21, August, 1931*

*Present status of acidophilus milk. W. D. Frost, T. H. Buttenworth and S. M. Farr.—p. 862.

Transformation of the intestinal flora through the feeding of unfermented acidophilus milk. R. P. Myers.—p. 867.

Studies in the viability of L. acidophilus in "acidophilus milk." W. L. Kulp.—p. 873.

Hygienic and sanitary features of milk production by the rotolactor process. J. G. Hardenbergh.—p. 895.

*Vol. 21, September, 1931*

*A study of the diets of Federal prisoners. P. E. Howe and A. H. MacCormick.—p. 993.

*Comparative dietary studies of American children of nursery school age. J. C. Winters.—p. 1003.

*Present status of acidophilus milk.* The success and popularity of L. acidophilus therapy has led to the manufacture of a great many products containing the organism, the most universally accepted of which is milk. A satisfactory acidophilus product must contain an enormous number of living bacilli in such a vital condition that they will maintain their viability in sufficient numbers until the product is used.

The outstanding features revealed by this extended research are: (1) when taken in massive doses, especially with milk, the L. acidophilus almost invariably establishes itself; (2) a 60 to 70 per cent change to the L. acidophilus type of intestinal flora relieves constipation; (3) though L. acidophilus is frequently found in the presence of decaying teeth it may quite definitely be differentiated from the organism associated with dental caries.

*A study of diets of Federal prisoners.* The article submits calculated data on the food furnished the United States' penitentiaries at Atlanta, Fort Leavenworth, Leavenworth, and McNeil Island, and at the reformatory at Chillicothe, Ohio. Quantities of various foods were grouped and calculations made of caloric value, the protein, fat and carbohydrate, and the calcium, phosphorus and iron content. Taken as a whole the prisoners receive an adequate amount of food. Success of the prison meals rests first on the steward with his ability to estimate, plan and properly serve the food, and second, on the discipline of the prison which assures an even and adequate service with minimum waste.

*Comparative dietary studies on American children of nursery school age.* The studies are based on records of food intake of Negro, American and Mexican children of preschool age; but the environment must be taken into account, and the groups were not large enough or evenly distributed enough for the evidence to be conclusive. Protein, calcium, phosphorus, iron and calories were the factors considered; and of the five, protein in each race was most likely to be deficient. The calcium and phosphorus deficiency of the Negro and Mexican race is twice that of the American, while the Negro is much less likely to be deficient in iron. Vitamin deficiency varied with the characteristic diet of the race, with marked deficiency of vitamin A in the Negro and Mexican race resulting in low resistance to infection.

## American Restaurant Magazine

*Vol. 14, August, 1931*

*Applied psychology in the restaurant. A. B. Carder.—p. 24.

Turning the tables on depression. T. F. Marshall.—p. 36.

*Vol. 14, September, 1931*

How do you like your rice? H. Ewing.—p. 41.

*How dishwashing has changed. T. E. Blair.—p. 49.

*Applied psychology in the restaurant.* Mind reactions as applied to the serving of food are outlined in this article. Psychology, which enters into the management of every place where food is served, is shown to be a most important consideration in good food service.

*How dishwashing has changed.* The importance of the modern dishwasher and cleanliness as demanded by the public in restaurants today is discussed in this article.

## Archives of Pediatrics

*Vol. 48, July, 1931*

Soft curd milk: nature's food for infants. R. L. Hill.—p. 417.

*A critical clinical study of concentrated and dried infant foods. Condensed milk. A. G. De Sanctis and J. D. Craig.—p. 439.

Raw basic feeding in anorexia of childhood. I. N. Kugelmass and E. L. Samuel.—p. 457.
*The mal-treated cause of malnutrition. E. P. Bacon. p. 471.
Pasteurization of breast milk at a low temperature. S. Hanson.—p. 478.

*Vol. 48, August, 1931*

*Cod liver oil emulsified in an extract of germinating grains: its tolerance by the infant gastro-intestinal tract and its prophylactic value. B. W. Jarvis.—p. 502.
Nephrosis: report of case with recovery. W. F. Bopp. —p. 516.

*Vol. 48, September, 1931*

Anemias of infancy and childhood. S. Nussbaum.—p. 578.
*A study of the prophylactic value of various anti rachitic agents. A. G. De Sanctis and J. D. Craig.—p. 595.

*A critical clinical study of concentrated and dried infant foods. Condensed milk.* The results of fifty cases in which infants were fed sweetened condensed milk are reported. It is shown that sweetened condensed milk apparently meets the nutritional requirements of the normal infant.

Vitamin A and B are both present in sufficient quantities and vitamin C and D must be supplied by antiscorbutic and antirachitic agents. Condensed milk is easily digested by the normal infant. The number of bacteria in this food is not sufficient to affect or injure the health. The gain in weight and the physical development in general, compare favorably with groups fed other foods. Secondary anemia does not result directly from the feeding of condensed milk. There was no greater incidence of secondary infection in the group of cases than in the control group.

*The mal-treated cause of malnutrition.* Appetite and digestion are physiologically influenced by emotion, therefore nutrition must be similarly influenced. Food nutrition is dependent upon good digestion. The function of appetite and hunger is the ingestion of food, upon which good nutrition is based. It is more simple to eliminate potential causes of malnutrition, both physical and emotional, than to cure the disease. Searching for and treating any physical conditions in a child or his environment, which may cause malnutrition, is advised.

*Cod liver oil emulsified in an extract of germinating grains: its tolerance by the infant gastro-intestinal tract and its prophylactic value.* The necessity of giving sufficient vitamins to the infant in the first few months of his life is becoming more apparent as a prophylactic measure against deficiency diseases. The greatest obstacle has been the incapability of the infant's gastro-intestinal tract for taking care of the food.

The purpose of the experiment was to determine whether the feeding of vitamins in emulsion form could be cared for by the gastro-intestinal tract, and whether the food was beneficial in preventing deficiency diseases. A watery extract of germinating wheat, oats, and barley grains, emulsified with cod liver oil and given with orange juice to provide vitamin C, was the food used, thus supplying vitamins A, B, D, E and C. This diet was begun at six weeks of age and continued over a year. Of the 150 cases, all were capable of digesting the food, and deficiency diseases were not found.

*A study of the prophylactic value of various antirachitic agents.* Infants between the age of 11 days and one year were given a similar dietary treatment over the same length of time with the same ratio of growth. Of the five groups, one was given 3 tablespoons of cod liver oil each day, another cod liver oil in tablet form three times a day, another one hundred units of viosterol each day, and the other two groups five and ten times as many D units of viosterol, respectively. The cod liver oil showed the highest percentage of complete protection, and the lowest percentage of clinical evidence of rickets. Concentrated cod liver oil had the next best percentage, while the largest number of units of viosterol did not give as good results of immunity as the cod liver oil.

## Hospital Topics and Buyer

*Vol. 9, July, 1931*

How food service is managed at Presbyterian, New York.—p. 14.
*Some fundamentals of purchasing and storage. E. Rowlands.—p. 25.
Is it economical to dispense with the dietitian? A. E. Boller.—p. 48.

*Vol. 9, August, 1931*

*Research—why it pays to buy advertised goods. F. G. McGaw.—p. 24.
A few pointers on housekeeping economics. L. Johnson.—p. 31.
The dietitian as purchasing agent. A. Boller.—p. 44.

*Vol. 9, September, 1931*

*Supervising the reducing and inducing of weight in the dispensary. A. E. Boller.—p. 56.
Practical hints on hospital economics. J. E. Shouse.—p. 66.

*Some fundamentals of purchasing and storage.* Useful and practical hints on purchasing applicable to dietary departments is given. Standardization of purchases is advised.

*Research—why it pays to buy advertised goods.* Research in purchasing prevents enormous waste to the consumer and makes certain that articles of every kind will do as much or more than is expected of them.

*Supervising the reducing and inducing of weight in the dispensary.* The most necessary rôles of the dietitian are the planning of an adequate palatable diet and inducing the patient to accept the right psychological attitude towards his own problem.

## Hotel Bulletin

*Vol. 47, August, 1931*

*The American cookery situation, J. D. Vehling.—p. 164.
Hot weather shop talk. J. L. Vermet.—p. 167.

*Vol. 47, September, 1931*

Fish and its value as food. J. W. Lesparre.—p. 237.
Catering profits are becoming increasingly difficult. P Simon.—p. 238.
*New problems confronting the modern caterer. J. D Vehling.—p. 239
Dining through the ages.—p. 241.

*The American cookery situation.* The demand for plain foods is, according to the writer of this article, due to prohibition. The younger generation today, he states, is utterly incapable of enjoying a good meal.

*New problems confronting the modern caterer.* Education of executives and standardization of raw materials are the two major problems of the catering industry today.

## Journal American Medical Association

*Vol. 97, July 4, 1931*

*Intestinal obstruction from eating bran. M. B. Davis.—p. 24.
The liver and vitamin A. Current Comment.—p. 34.

*Vol. 97, July 11, 1931*

*The work of the Committee on Foods of the American Medical Association. M. Fishbein.—p. 83.
The action of vitamin D. Editorial.—p. 105.

*Vol. 97, July 18, 1931*

Diet in intestinal disorders. J. A. Bargen.—p. 151.
Diabetic lipemia retinalis. L. A. Chase.—p. 171.
Iron and copper in the diet. Editorial.—p. 180.
Carotene and vitamin A. Editorial.—p. 181.

*Vol. 97, July 25, 1931*

Diabetic coma with marked hyperglycemia and recovery. P. A. Gray and W. A. Sansum.—p. 230.

*Vol. 97, August 1, 1931*

*Avitaminosis: specific effect of vitamin B on growth and lipid metabolism—lipemia as a symptom complex. B. Sure and M. E. Smith.—p. 301.
Multiple myeloma and diabetes insipidus. M. J. Bach and W. S. Middleton.—p. 306.
Intramuscular use of liver extract. M. B. Strauss, F. H. L. Taylor and W. B. Castle —p. 313.

*Vol. 97, August 8, 1931*

*Antirachitic potency of the milk of cows fed irradiated yeast or ergosterol. A. F. Hess, J. M. Lewis, F. L. MacLeod and B. H. Thomas —p. 370.
The iron "index" of the blood. Editorial.—p 392.
Genesis of vitamin D in the body by ultraviolet irradiation. Editorial.—p. 392.

*Vol. 97, August 15, 1931*

The significance of diet in treatment. R. M. Wilder.—p. 436.

*Vol. 97, August 22, 1931*

*The effect of hypothyroidism on gastric and intestinal function. T. R. Brown.—p. 511.

*Vol. 97, August 29, 1931*

*An appraisal of the present treatment of diabetes. E. P. Joslin —p. 595.
*Massive dosage of liver extract in pernicious anemia. J. E. Counery.—p. 605.
Variations in vitamin C content of foods. Current comment.—p. 648.

*Vol. 97, September 5, 1931*

*Material from liver active in pernicious anemia: further observations. R. West and M. Howe.—p. 685.
Metabolism in scurvy. Editorial —p. 709.

*Vol. 97, September 12, 1931*

The cure of infantile rickets with Tungsten-filament radiation. H. J. Gerstenberger and A. J. Horesh.—p. 766.

The pathology of vitamin A deficiency. Editorial—p. 782.

*Vol. 97, September 26, 1931*

*The relationship of disorders of the digestive tract to anemia. W. B. Castle, C. W. Heath, M. B. Strauss and W. B. Townsend.—p. 904.
*The treatment of nephritic edema by acid. F. H. Lashmet.—p. 918.

*Intestinal obstruction from eating bran.* Bran is one of the most indigestible foods found in nature, its original design being to carry seed unchanged through the intestinal tract of herbworms. A person with perfect digestion, except for constipation, may be helped by the addition of roughage to the diet. Those who have inefficient and irritable bowels will not be aided. Particles of bran may collect and form a hard ball in the intestines of individuals suffering from partial obstruction or a sluggish tract.

*The work of the committee on foods of the American Medical Association.* The committee on foods was created to prevent or discourage unwarranted incorrect or false advertising claims in promotion of food products—thus protecting the public and the medical profession against false advertising. A particular task of the committee has been a consideration of especially prepared foods for infants and children and the establishment of standards for infant food, evaporated milks and dried milks.

*Avitaminosis: specific effect of vitamin B on growth and lipid metabolism-lipemia as a symptom complex.* It is believed to a certain extent that vitamin B, other than producing growth through its physiological influence in stimulating the appetite, also exerts a specific effect on lactation, characterized by the growth and survival of the nursing young unrelated to food and water intake. Deficiency of vitamin B produces a reduction of the glycogen content in the livers of lactating mothers and the nursing young, which indicates the presence of marked lipemia.

*Antirachitic potency of the milk of cows fed irradiated yeast or ergosterol.* An experiment was carried out in which it was proved that cow's milk could obtain a high antirachitic potency if the cows were fed irradiated yeast or ergosterol. These substances may easily be added to the fodder which the cows eat. Irradiated yeast induced a more potent milk than viosterol.

The administration of this milk to lactating mothers may augment the antirachitic potency of breast milk, it is believed.

*The effect of hypothyroidism on gastric and intestinal function.* There is no characteristic gastro-intestinal picture presented by the group of cases studied, the digestive symptoms, gastro or intestinal, being purely functional in nature. It is evident that hypothyroidism plays a considerable part in certain cases of intractable constipation, not corrected by the usual means, which are not infrequently observed in women in the late forties or fifties. As regards the gastric secretory condition and those cases with relatively slight basal reductions, the readings are quite normal. In the cases with very low readings, there was a marked tendency to gastric sub-acidity, a considerable portion of cases presenting achlorhydria.

In the cases of intractable constipation, it is advisable to consider the possibility of an unrecognized hypothyroidism playing a part in the picture which can be relatively easily determined by careful basal metabolic readings and by the effect of therapy with thyroid extract if the readings are low.

*An appraisal of the present treatment of diabetes.* The first year of diabetes is now the safest, whereas formerly it was the most serious. Attempts to show that harm results from an excess of cholesterol in the blood have been unsuccessful. It is fair to say that at present a carbohydrate content of the diabetic diet between 100 and 200 gm. can be accepted as a standard range, whereas below 100 gm. is almost as experimental as above 200 gm. The protein standard is between 3 gm. per kilogram for a young child and 1 gm. or 0.6 gm. per kg. for an adult or nephritic patient; 150 gm. carbohydrate is the most common diet and one which enables the diabetic patient to live comfortably.

*Massive dosage of liver extract in pernicious anemia.* Six cases of pernicious anemia were treated with single massive doses of liver extract. Hematologic and clinical improvement followed in all cases. The clinical improvement following single dosage therapy was sufficient to carry the patient through the period of emergency and obviate the possibility of irregularity of dosage. This single massive dosage did not constitute complete specific treatment. All patients so treated were subsequently given adequate daily doses of liver extract when it became apparent that the peak of the curves of the red blood cells had been reached.

From the initial level of the red cells the maximum increase of erythrocytes could not be predicted. The administration of single massive doses of liver extract was without significant effect upon the systolic and diastolic pressure and upon the blood sugar content.

*Material from liver active in pernicious anemia: further observations.* Though the antianemic substance in liver has not been clearly identified, various properties which throw light on its nature have been determined.

Barium and quinine derivations of nitrogenous acids have been obtained from liver. Intravenous or subcutaneous injections of these have been very beneficial to pernicious anemia patients. Chemically, these derivations have some relationship to pyrrol derivatives which occur in the respiratory pigments. Daker has isolated a tribasic acid containing the pyrrolidin ring from liver, and obtained positive results by its injection.

Though highly purified chemical preparations from liver require very large quantities of the original material, a less refined preparation from only 100 gm. of liver gives results —intravenous injections of which are superior to large amounts of whole liver taken by mouth. This may be due to the fact that intestinal bacteria readily destroys the pyrrolidin ring, thus rendering a large part useless.

The tri-basic acid obtained by Dakin, under proper conditions, yields its acid groupings, leaving a pyrrole base. There may be a similar reaction involving the blood and bile pigments in the body. The response to the injection of tri-basic acid is greater than a simple incorporation of the pyrrol precision would give in increasing hemoglobin. It may enable the combination of hemotophosphyrin with iron and hemin. The acid is thought to have a structure similar to that of hemin.

*The relationship of disorders of the digestive tract in anemia.* Nutrition is important in anemia from loss of blood, as well as in pernicious anemia. Anemia may be produced by defective diet. However, though an adequate diet may have been taken, it may be poorly absorbed from the digestive tract. Poor teeth or some abnormality of the mouth or throat have their effect, not only in the assimilation of the diet but in its choice. Patients with digestive tract disorders, complicated with diarrhea, are more likely to develop anemia than others. The restricted diet usual for digestive tract disorders may cause a lack of the materials required for blood building.

As liver extract given by injection is more effective than when given by mouth, there may be difficulty in assimilating the active substances.

*The treatment of nephritic edema by acid.* Experiments were undertaken to determine the effect of fluid intake, sodium chloride intake, total ash intake and the reaction of the ash.

It was found that edema was independent of fluid intake and that chlorides increased edema, except when given as acids after they decreased it. The total ash intake was arranged to be basic, neutral, and acid in reaction. When basic, edema increased; when neutral it remained level; and when acid, edema decreased. These results were independent of fluid intake and of amount of chlorides.

On a low-protein, salt-poor diet with neutral ash and forced fluids, good results have been obtained by adding salts to give an acid reaction of total ash.

## Journal of Biological Chemistry

*Vol. 92, July, 1931*

The interrelationship between the dietary fat and the phosphorus distribution in the blood of lactating cows. C. M. McCoy and L. A. Maynard. —p. 273.

*Further studies on crystalline insulin. D. A. Scott.—p. 281.

The effect of ingested cottonseed oil on the composition of body fat. N. R. Ellis. C. S. Rothwell and W. O. Pool.—p. 385.

Studies on the starch iodine reaction. J. Field.—p. 413.

*Studies in nutritional anemia. Quantitative variations in iron, copper, and manganese supplements. H. S. Mitchell and L. Miller.—p. 421.

The effect of lactose and the acid-base value of the diet on the hydrogen ion concentration of the intestinal contents of the rat and their possible influence on calcium absorption. C. B. Robinson and C. W. Duncan.—p. 435.

*Vol. 92, August, 1931*

The influence of roentgen rays on the acid-base equilibrium. D. H. Sprunt.—p. 605.

*Beneficial effects of fat in high sucrose diets when the requirements for antineuritic vitamin B and the fat soluble vitamin are fully satisfied. H. M. Evans and S. Lepkovsky.—p. 615.

*The influence of the ration of the cow upon the vitamin B and vitamin G content of milk. C. H. Hunt and W. E. Krauss.—p. 631.

*The lack of relationship between the calcium, protein and inorganic phosphorus of the serum of nonnephritic children. G. Stearns and G. C. Knowlton.—p. 639.

Effects of deprivation of manganese in the rat. E. R. Orent and E. V. McCollum.—p. 651.

Studies in ketone body excretion. Daily variations in the ketone bodies of normal urine and the ketonuria of short fasts with a note on diabetic ketonuria during insulin treatment. J. A. Behre.—p. 679.

Rickets in rats. The acid-base equilibrium of the blood in rickets and tetany. A. T. Shohl. H. B. Brown, C. S. Rose, D. N. Smith and F. Cozad. —p. 711.

A report on the effect of light on pigment formation in apples. G. W. Pearce and L. R. Streeter.—p. 743.

*Vol. 93, September, 1931*

*Hemoglobin production. The relief of anemia due to milk diet, by feeding amino acids and related compounds. D. L. Arabkin and H. K. Miller. —p. 39.

*The rôle of copper in hemoglobin regeneration and in reproduction. H. L. Keil and V. E. Nelson. —p. 49.

*The calcium content of the body in relation to that of the food. H. C. Sherman an L. E Booker.—p. 93.

An improved technique for the production of nutritional anemia in rats. C. A. Elvehjem and A. R. Kemmerer.—p. 189.

*Further studies on crystalline insulin.* Crystalline insulin was first isolated from commercial extract of beef pancreas by Abel in 1926. Since then Harrington and Scott, using a different method, found identical crystals agreeing in potency also. Several reports concerning the sulphur content of crystalline insulin disagreed, and it was noted that many diabetics show a localized sensitivity reacting to injections of beef insulin, but not to hog insulin.

Experiments were carried out to clear up some of these points. It was found: (1) microscopically, crystals isolated from ox, sheep, hog and fish were the same in appearance and their physical properties appeared identical; (2) the crystals could be recrystallized ten times and still retain the same form as the original; (3) a chemical analysis was made of the crystal and there was a fair agreement for carbon, sulphur and nitrogen, although the sulphur values differed.

*Studies in nutritional anemia. Quantitative variations in iron, copper, and manganese supplements.* Young rats suffering from secondary anemia produced by feeding them fresh milk from the time of weaning were used. Hemoglobin determinations were made weekly on each until a normal level was reached. Solutions of salts were prepared in such dilutions that 0.2, 0.5, or 2 cc. daily would supply the desired amounts.

1. They were fed salts of aluminum, tin, antimony and zinc, with negative results.

2. Pure salts of iron were fed alone, resulting in an increase in hemoglobin concentration.

3. Copper 0.01 mg. daily was added to 0.5 mg. of iron and found potent and not toxic.

4. Manganese was fed as a supplement to each of the quantities of iron and combinations of iron and copper, but had negligible action on hemoglobin, although it stimulated growth.

5. 0.25 mg. of iron daily is adequate for the rat if sufficient copper is present in the ration, that is, 0.1 mg. daily.

*Beneficial effect of fat in high sucrose diets when the requirements for antineuritic vitamin B and the fat soluble vitamins are fully satisfied.* Fat free diets which are no longer improved by the addition of vitamin B can be improved by the addition of fat. This improvement is not due to fat soluble vitamins or other ingredients since the use of synthetic fats improved the fat free diets as well as did the natural fats. In the natural fats, cocoanut oil was more beneficial than lard.

*The influence of the ration of the cow upon the vitamin B and vitamin G content of milk.* Milk from cows on pasture has a higher vitamin G content than cows fed on dry feed. The quality of the hay may vary with the climatic conditions. The vitamin B content is not affected by the feed. Vitamin G is synthesized best from feeding on plants during their rapid growth and lessens as the plant matures.

*The lack of relationship between the calcium, protein and inorganic phosphorus of the serum of non-nephritic children.* There are well marked changes in the levels of serum protein and inorganic phosphorus between birth and maturity. The serum protein rises and the inorganic phosphorus lowers after the fourth month. No constant relationship was observed between the level of serum calcium and serum protein, or serum inorganic phosphorus, in the experiments.

*Hemoglobin production. The relief of anemia due to milk diet, by feeding amino acids and related compounds.* It has been shown that leucine, cystine, glycine, a-amino valeric acid, and glutamic acid do not affect milk anemia, and succinic acid and succinimide are somewhat effective in the relief of it. The onset of anemia has been retarded by the use of iron salts at a low level, but these will not effect the curing of anemia once it is produced. The supplementing of milk with sodium glutamate causes a greater resistance to anemia in rats than when the rats are fed iron alone, or iron and alanine.

*The rôle of copper in hemoglobin regeneration and in reproduction.* Nutritional anemia is readily produced in rats fed on a whole milk diet. It also produces a change in the dark coated rats. Pure iron when added to milk will not regenerate hemoglobin, nor will the addition of salts or vanadin, tetamin, manganese, nickle, arsenic, zinc, chromium, cobalt, tin or nickel. Copper is the only element in the test which has a positive effect on the regeneration of hemoglobin.

*The calcium content of the body in relation to that of the food.* White rats of the same strain and known nutritional history were used. They were raised to definite ages on diets varying in calcium. The animals were divided into two series. In the first series, the calcium content of the food was varied by varying proportions of wheat and milk. In the second series, calcium was the sole significant variable of the food. The animals were killed and charred and the percentage of calcium calculated on the base of the body-weight.

1. For both series it was found that at each of the ages studied the amount of calcium in the body of the growing animal varied with the calcium content of the food.

2. The average per cent of calcium in the bodies of the normal adult male rats equaled 1.096, in the female rats, 1.23 per cent—although these were reared on diets quite different with respect to calcium content. The animal body is thus able to retain calcium at a subnormal rate on calcium poor diets, and may at an abnormally late age reach the per cent of body calcium of normal adult rats.

3. Animals of the second series, in whose food calcium was the sole significant variable, grew at the same rate on four different levels of calcium intake and those on low calcium intake had the same physical appearance as those on high calcium intake, but chemical analysis showed these bodies were calcium poor.

4. In an experiment extending through several generations and covering rats of both sexes it was found that diets of higher calcium content result in early maturity.

## Journal of Home Economics

*Vol. 23, July, 1931*

College training for commercial food work. E. Howe. —p. 631.

*Vol. 23, September, 1931*

*The Weston Cafeteria patent. M. S. Ehlers.—p. 828.
Illustrative material for the teaching of foods and nutrition. J. I. Rowntree.—p. 854.

*The Weston cafeteria patent.* Recently suits have been instigated, declaring that infringement has been made on a cafeteria patent. Two organizations came to the front to defend the cafeteria operator: the Food Service Equipment Association, an organization of jobbers and manufacturers supplying the restaurant industry and the National Restaurant Association, an organization of representative and progressive restaurant owners and operators.

## Journal of Nutrition

*Vol. 4, July, 1931*

Coefficients of digestibility of the constituents of milk and the balance of calcium and phosphorus in calves on a milk diet, J. S. Hughes and H. W. Cove.—p. 163.

*The effect of mineral oil administration upon the nutritional economy of fat-soluble vitamin. Studies with vitamin A of butter fat. R. W. Jackson.—p. 171.

The vitamin value of cod liver meal. A. D. Holmes, M. G. Pigott and D. F. Menard.—p. 193.

*The effect of pasteurization upon the vitamin C content of milk in the presence of certain metals. E. W. Schwartze, F. J. Murphy and G. J. Cox.—p. 211.

*The mineral exchanges of man. Organization of metabolism ward and analytical methods. S. H. Bassett, C. A. Elden and W. S. McCann. —p. 235.

*Fat soluble vitamins. The distribution of vitamin A in tomato and the stability of added vitamin. D. H. Steenbock and I. M. Shrader.—p. 267.

*Vol. 4, September, 1931*

*Effect of vitamin A and D on resistance to infection. L. C. Boynton and W. L. Bradford.—p. 323.

The effects of radiant energy on experimental hemolytic anemia. H. S. Mayerson and H. Laurens.—p. 351.

*Food intake in pregnancy, lactation and reproductive rest in the human mother. C. F. Shukers, I. G. Macy, E. Donelson, B. Nims and H. A. Hunscher.—p. 399.

Glycogen and fat formation in rats. Carbohydrate-free diets. E. M. Grieshermier.—p. 411.

*Distribution of manganese in foods. W. H. Peterson and J. T. Skinner.—p. 419.

*The effect of mineral oil administration upon the nutrition economy of fat-soluble vitamin. Studies with vitamin A of butter fat.* Mineral oil when mixed directly with an otherwise adequate amount of butter fat, exerts a markedly harmful effect upon the vitamin A economy of the rat. The same amount of the same oil, given in separate doses beginning before and ending after the ingestion of the butter fat, causes only a slight depression of growth and only questionably increased ophthalmia and abscess formation. The formation indicates further that when a 50 per cent safety margin of the vitamin is present—no detectably adverse action occurs as judged in this instance by vaginal smears. It is obvious from the experiments that although a vitamin A deficiency such as may be brought about by mixing mineral oil with the butter fat should be avoided, it does not necessarily follow that under the conditions of the customary human therapeutic practice, mineral oil is responsible for any such deficiency.

*The effect of pasteurization upon the vitamin C content of milk in the presence of certain metals.* The effect upon the vitamin C content when pasteurizing fresh milk aerobically in aluminum, in tinned copper, and in copper tubular pasteurizers has been studied. The destruction of vitamin C was placed at 20–40 per cent in aluminum. In tinned copper the loss was slightly greater than with aluminum. Using naked copper resulted in a destruction of at least 80-90 per cent of the antiscorbutic vitamin, but since the exposure to copper as well as the aerobic pasteurizing process both tend to destroy the vitamin, all of the 80–90 per cent can not be charged to copper. The practical importance of this experiment is that copper is again shown to be unsuited for the construction of dairy equipment so far as the conservation of vitamin C is concerned.

*The mineral exchange of man. Organization of metabolism ward and analytical methods.* This paper gives in detail the technique for a comprehensive study of the simultaneous exchanges of sodium, potassium, calcium, magnesium, iron, nitrogen and phosphorus. The organization and methods of a special metabolism ward are described. A comparison is made of the results of analyzing a diet for a day and of calculating the total mineral intake from tables. The values found for

calcium were consistently lower than the calculated, and for phosphorus, potassium, magnesium, and iron, were within the limits of accuracy of the procedure as a whole. The same diet menus, weighed out and analyzed in different years, showed surprisingly close agreement on analysis. The methods of preparation of foods and excreta for sampling, ashing, and analysis are given in full detail. The analytical methods were selected after many trials as those giving the best results with the materials of both food and excreta.

*Fat soluble vitamins. The distribution of vitamin A in tomato and the stability of added vitamin.* Experiments on rats have proved the remarkable potency in vitamin A of tomato preparation. It has been shown that the whole tomato contains 32 times as much vitamin as the clear yellow serum. Vitamin D added in the form of irradiated ergosterol was found to have maintained its activity after sterilization, followed by 13 months storage at 37 degrees C.

*Effect of vitamins A and D on resistance to infection.* Rats fed on a vitamin A free diet showed a definitely increased susceptibility to infection as compared with the controls which received cod liver oil, and with rats on a diet deficient in vitamin D. This increased susceptibility to infection was manifested early, having marked influence before physical signs of the deficiency were present. A dietary so deficient in vitamin D as to lead to the development of rickets is probably so deficient in vitamin A as to render the animal more susceptible to invading organisms.

*Food intake in pregnancy, lactation and reproductive rest in the human mother.* Records of three women, whose physiological processes were known to be adapted to the requirements of pregnancy and lactation show that the food requirements of pregnancy and post-lactation are approximately the same; that there is a curtailment of food near the close of pregnancy; that lactation increases the food demands for all the dietary constituents 60 per cent above those for pregnancy and that there are marked daily fluctuations in food intake during lactation.

*Distribution of manganese in foods.* The manganese content of 83 representative food materials is given, arranged in descending order with respect to their manganese content. Twelve classes of foods are listed as follows: nuts, cereals, dried legume seeds, green leafy vegetables; dried fruits, roots, tubers and stalks; fresh fruits; dried fruits; non-leafy vegetables; animal tissue; poultry and poultry products; dairy products; fish and sea food. Marked variation in manganese content was found among the several foods of each group. In typical American diets cereals and their products furnish the greatest source of manganese.

## Modern Hospital

*Vol. 37, August, 1931*

The dietitian's place in the new diabetic regime. H. J. John.—p. 128.

Buying satisfactory cleaning material economically.—p. 140.

*Vol. 37, September, 1931*

How Toronto General feeds more than a thousand patients. M. Porter.—p. 138.

Where diets for sick children are a specialty. K. C. Burns.—p. 140.

Serving diversified diets at St. Michael's Hospital. M. McFarlane.—p. 142.

*Vol. 37, October, 1931*

Satisfying the dietary needs of many types of patients. H. Reutimann.—p. 77.

How Bethesda Hospital solves its dietetic problems. R. Sentiff.—p. 128.

Where food service is simple and homelike. M. Holle.—p. 130.

The functions and responsibilities of the special diet kitchen. Sister Romulad.—p. 134.

Serving food in a children's hospital. E. N. Ylvisaker.—p. 136.

# BOOK REVIEWS

*Nutrition and Physical Fitness.* By L. Jean Bogert, Ph.D., formerly Instructor in Medicine, University of Chicago. Philadelphia: W. B. Saunders Company, 1931, pp. 554.

An authentic and readable book on nutrition, written for the non-professional reader, is a welcome addition to the literature on this subject. The author has succeeded admirably in fulfilling her threefold purpose as stated in the preface. Her varied experience in the fields of home economics, nutrition, physiology and medical chemistry, and her practical point of view, have enabled her to glean the most useful information from each of these branches. Her simple non-technical language and concrete illustrations make this information available to the comparatively large group of people who have no previous knowledge of chemistry. In addition she has frequently pointed out how such knowledge may be utilized for preventing ill health and promoting physical fitness.

This is distinctly a book on applied nutrition. The qualitative but not too elementary approach makes it suitable as a text in courses offered for general academic or liberal arts students in colleges, and for the more intelligent general public. It does not attempt to give experimental evidence or original sources for the scientific facts stated and is consequently not a suitable text for use in professional courses. It lacks the accurate scientific and quantitative data required for such groups.

The author has quite successfully steered the difficult course between the dogmatic statements found all too frequently in popular health literature and the mere enumeration of purely scientific facts or experimental findings characteristic of more advanced texts. The information given attempts to guide the reader to common sense dietary control to fit his personal needs. The excellent chapter on Food Fads and Fancies should dispel many a false notion and morbid anxiety about food which is not uncommon among those who have read isolated and unscientific health articles.

The chapters on Meal Planning and Diets for Special Conditions are practical and usable. Throughout the book the author's faculty for paralleling the pro and con on a given subject is helpful in weighing conflicting evidence and differences of opinion. The concise and straightforward style appeals to the masculine reader.

This book should do much toward convincing the sceptical person that some sane knowledge of nutrition will yield a good return in health and physical fitness.

HELEN S. MITCHELL, PH.D.

*Food Allergy.* By Albert H. Rowe, M.S., M.D. Philadelphia: Lea and Febiger, 1931, pp. 442. Price $5.00.

Dr. Rowe presents the first monograph on the subject of food allergy; as the originator of the elimination method of diet trial his views should be of great interest to dietitians. In the chapter on Treatment by Elimination Diets and General Measures, diets are given with implicit instructions as to their administration. Menus and recipes are included as well. The entire literature of food allergy and a complete bibliography of this subject is included.

*Alimentary Anaphylaxis.* By Guy Laroche, Charles Richet, Fils, and Francois Saint-Girons, translated by Mildred P. Rowe and Albert H. Rowe, Berkeley, California: University of California Press, 1930, pp. 139.

The authors present many interesting phases of the problem of food sensitization. The discussion of milk allergy will be especially interesting to those dealing with infants

and children. In addition to indicating the field of accomplishment in this subject in France, the book has an historical interest since Charles Richet, the father of one of the authors, created the term "anaphylaxis" in 1902 to designate "the curious tendency that certain poisons possess of increasing instead of diminishing the sensitivity of the organism to their action."

*Nutrition and Diet in Health and Disease*, Second Edition, revised and reset. By James S. McLester, M.D. Philadelphia: W. B. Saunders Company, 1931, pp. 891. Price $8.00.

The author has prepared this second edition appreciating that in few departments of medicine have such rapid strides been made as in the science of nutrition. New material has been added, especially concerning the vitamins, minerals and deficiency diseases. The discussions of diabetes, obesity, gout, and the disorders of digestion have been revised, with added sections concerning the toxemias of pregnancy, food poisoning, irritable colon, and protozoan infections. The sections dealing with enzymes, protein requirement, and epilepsy, as well as the chapters on diseases of the blood have been rewritten.

*Nutrition in Health and Disease for Nurses*, Fourth Edition, revised. By Lenna Cooper, B.S., M.A., M.H.E., Edith M. Barber, B.S., M.S., and Helen S. Mitchell, B.A., Ph.D. Price $3.00. Philadelphia: J. B. Lippincott Company, 1931, pp. 608.

The success of this manual and the alertness of its authors is attested by the fact that it has had four revisions in less than three years. There is a new chapter on allergy; the chapter on diseases of the blood has been largely rewritten. The dehydration diet is considered in the treatment of epilepsy. The work of Pemberton and Fletcher has been reviewed in the discussion of arthritis. The authors have included the outlines of courses of dietetics for student nurses as prepared by a sub-committee of the Education Section of the American Dietetic Association, with detailed and helpful suggestions as to "what and how to teach." The recipes and illustrations of prepared dishes continue to be accurate, appetizing and artistic.

*Tables of Food Values*. By Alice V. Bradley, B.S., Supervisor and Instructor of Nutrition, State Teachers College, Santa Barbara, California. Peoria, Illinois: The Manual Arts Press, 1931. Price $2.00, pp. 128.

Appreciating the need of complete tables of food giving the composition of "average servings" without the necessity of calculation, Miss Bradley has weighed and measured samples repeatedly to determine the size and weight of what we call "average servings." The number of grams of protein, fat and carbohydrate, the caloric value, the mineral "shares," according to the method devised by Dr. Mary Swartz Rose, the vitamin value, the value as source of bulk, and the acid and base reaction is given for an amazing number of foods. Part II gives the food value of 100 gram portions of commonly used foods, offering more exact computation of diets, for the use of physicians, dietitians and diabetic patients. The book is decidedly stimulating.

*American Standards and Planes of Living*. By Thomas D. Eliot, Professor of Sociology, Northwestern University. Price $5.00. Boston: Ginn and Company, 1931, pp. 931.

The author has arranged a timely and monumental résumé of teaching material and methods concerning the social economics of consumption. The book is fascinating reading, aside from its value as a text. The selections presented recognize the cultural, psychological, and ethical approaches to the field, as well as its economic, sociological, and humanitarian aspects. It is a masterpiece of its kind, offering a better and a broadening understanding of the varying social conditions in this country. Dietitians with vision should read it.

## BOOKLETS RECENTLY RECEIVED

*Influence of Education on the Food Habits of some New York City Families*. By L. H.

Gillett and Penelope Burtis Rice. Published by the New York Association for Improving the Condition of the Poor, 105 East 22d St., New York City. Price 35 cents.

This is a study of the food value of the diets in 120 New York City families, with a comparison of the findings with some previous dietary studies and recommendations for the selection of food which are in keeping with recent scientific facts.

*Budgeting the Low Income.* Issued by the New England Home Economics Association. Price 45 cents on application to Blanche F. Dimond, 502 Park Square Bldg., Boston, Mass.

*The Child from One to Six, His Care and Training.* Publication No. 30, United States Department of Labor, Children's Bureau. Price ten cents.

*Factors for Converting Percentages of Nitrogen in Foods and Feeds into Percentages of Proteins.* Circular No. 183, United States Department of Agriculture. Price five cents.

# NEWS NOTES

*The American Dietetic Association* held its fourteenth annual convention at the Hotel Gibson, October 19 to 22. The attendance was one of the largest in the history of the Association; the number of exhibitors filled the available space and offered much of interest to the delegates.

Margaret Gillam presided at the opening session, when Dr. A. C. Bachmeyer, Superintendent of the Cincinnati General Hospital, gave the opening address on "The Dietitian as an Administrative Officer in the Institution." The speaker impressed all with his keen understanding of the problems outlined. He was followed by Dr. Julius Hess of Michael Reese Hospital, Chicago, who gave clear cut suggestions on "Infant Feeding;" he mentioned the various proprietary foods on the market and the necessity for the dietitian's being able to judge of the merits of each.

Monday noon the Hotel Gibson entertained the delegates at a delightful welcoming luncheon, with Mary Barber, second Vice President of the Association, presiding. Miss Barber made the occasion one of the most pleasing of the week's events.

Monday afternoon, Miss Gillam presided over the most "businesslike" business meeting the Association has held in years. The President's report indicated that an economy program, in keeping with the times, had resulted in a hopeful surplus in the treasury with promise of a bimonthly JOURNAL in 1932. Reports were made by the officers of the Association, the Section Chairmen, the various Committee Chairmen, the Business Manager and the JOURNAL Editor. Among the interesting developments reported, were Mary Barber's progress as official author of the Association's history, the work of Dr. Storm on the reclassification of the dietitian's status in government service, the excellent work of Millie Kalsem on the Association's "Organization Book," and Mrs. Baumhoff's report that 66 hospitals were now on the accredited list.

The following officers were elected:

President-elect, Dr. Kate Daum, Director of Nutrition, University Hospital, and Assistant Professor, University of Iowa Medical School, Iowa City, Iowa.

First Vice President, Mrs. Katherine Mitchell Thoma, Dietitian, Michael Reese Hospital, Chicago.

Second Vice President, Annie Laird, University of Toronto, Toronto, Canada.

Secretary, Phyllis Dawson Rowe, Dietitian, Johns Hopkins Hospital, Baltimore.

Treasurer, Nelda Ross, Director, Department of Nutrition, Presbyterian Hospital, New York City.

Nominating Committee:

Grace Bulman, U. S. Veteran's Bureau, Washington, D. C.

Mrs. Mary DeGarmo Bryan, Teachers College, Columbia University, N. Y. C.

S. Margaret Gillam, University Hospital, Ann Arbor, Michigan.

Elizabeth Hayward, Santa Barbara Cottage Hospital, Santa Barbara, California.

Fairfax Proudfit, Memphis, Tennessee.

The Section Chairmen for the coming year are:

Administration Section, Faith McAuley, University of Chicago, Chicago.

Education Section, Mrs. Mary DeGarmo Bryan, Teachers College, N. Y. C.

Social Service Section, Laura Comstock, Eastman Kodak Company, Rochester, N. Y.

Diet Therapy Section, Mrs. Dorothy Stewart Waller, University Hospital, Ann Arbor, Michigan.

Mrs. Thelma Tubbs Currier was appointed member of the JOURNAL Board in place of Mrs. Copher, and Mrs. Waller in place of Dr. Koehne.

The banquet Monday evening was an enjoyable affair with Margaret Gillam presiding in her usual gracious manner. Judge

Florence E. Allen of the Supreme Court of Ohio, the speaker of the evening, held the attention of all by her inspiring address. She deplored the conditions of overproduction on the one hand and want on the other, with no one able to bridge the gap and adjust the situation. Dietitians, interested as they are in "housekeeping," should concern themselves as well in the greater problem of "international housekeeping."

Tuesday morning the Social Service Section held a breakfast meeting with Laura Comstock presiding. At the general session Dr. Newburgh of the University of Michigan outlined his work done in estimating heat loss from metabolized food as water vapor. A summary of his paper will appear in the March JOURNAL. Dr. Lashmet's paper presented at this meeting, appears in this issue of the JOURNAL. Dr. James P. O'Hare, of Peter Bent Brigham Hospital, Boston, gave an excellent summary of "Present Day Dietetic Therapy in Nephritis and Allied Conditions."

The Administrative Luncheon program which followed was presided over by Helen Gilson. The reports given were useful and constructive, the bibliography being unusually comprehensive.

At four o'clock, teas were given by the University of Cincinnati School of Household Administration and by the Children's Hospital at Vincent Hall, offering a pleasant respite from the day's activities.

The reports on "Quality Studies of Therapeutic Diets," by Lute Trout, Sister Mary Victor and Elizabeth Hayward at the Tuesday evening Diet Therapy Section dinner with Mrs. Waller presiding, were of arresting interest. These reports are to appear in the JOURNAL.

The annual Red Cross breakfast was held Wednesday morning with Clyde Schuman presiding.

Emma Feeney of Pratt Institute presided Wednesday morning when Mabel Little spoke on "Styling Food," showing interesting exhibits of colored glass and china and emphasizing the need of good food sense and a feeling for color, flavor, size and suitableness of portions. Miss Dyer's paper which followed appears in this issue of the Journal. She was followed by Mrs. McGuckin of the "Maramor," Columbus, Ohio, who spoke on "The Graduate's Preparedness to carry on the Purpose of a Food Enterprise." Edith Smith, who followed, spoke on "Personnel Work with Hospital Employees."

Anna Boller presided at the Affiliation luncheon Wednesday noon. At the general sessions following, Dr. Martha Koehne gave a well-rounded summary of recent work on "Relation of Diet to Dental Caries" which will appear in the March JOURNAL. Dr. Ada Hart Arlitt of the University of Cincinnati followed with "The Modern Parents' Attitudes and Science." Frances Stern's paper on "A Venture in Teaching Applied Dietetics to Health Workers" was supplemented by instructive charts. The Wednesday evening dinner meeting was presided over jointly by Mrs. Bryan and Miss Comstock and reports of the Social Service and Education Sections were given. Interesting local trips were planned for Thursday, the final day of the meeting.

Cincinnati, the scene of the Association's second annual convention in 1919, when only 169 dietitians were present, was a happy choice for the fourteenth meeting. The local Dietetic Association, with Mrs. Eva N. Ylvasaker as President, worked out their hospitality program to the last detail and nothing seemed to have been overlooked. Eleanor R. Maclay, publicity chairman, and the dauntless Laura Judd Bryant, editor of the successful convention daily, worked day and night to make the meeting a success. The daily paper was published through the courtesy of the Cincinnati Union Gas and Electric Company, of which Mrs. Bryant is Director of the Home Service Department. The lovely autumn flowers that graced the speaker's table during the meetings were the gift of the Cincinnati Home Economics Association. The Association was happy to have its first (now the honorary) President in attendance, Lulu G. Graves, also three delegates from foreign countries—Mabel G. Flanley of Melbourne, Australia; Marja Brzozowska of Warsaw, Poland; and Anna Buchan of Edinburgh, Scotland. Four radio talks over WSAI were given during the con-

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vention by Anna Boller, Dr. Martha Koehne, Mrs. Brown of the local Red Cross chapter and Clyde Schuman, National Red Cross Nutrition Director. The local group, the program chairman, Mrs. Currier, and Miss Lenfest the business manager, deserve great credit for the success of the meeting. The following exhibitors did their part toward this success:

Burton Range Company, Cincinnati, Ohio
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Journal of Home Economics, Baltimore, Md.
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Kraft-Phenix Cheese Corporation, Chicago, Illinois
J. B. Lippincott Company, Philadelphia, Pa.
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Mellin's Food Company, Boston, Massachusetts
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Van Camp's, Indianapolis, Ind.
Wander Company, Chicago, Illinois
White House Conference on Child Health, Washington, D. C.

EMMA L. FEENEY.

*The Baltimore Dietetic Association* met at The Polytechnic Institute in October. The program was in charge of Miss Faulkner, Supervisor of Home Economics in the Baltimore Public Schools. Mr. Sylvester, Director of Vocational Education, discussed "Organization and Administration of Public School Cafeterias;" Mr. Mueller, City Engineer, spoke on "Cafeteria Equipment from the Engineer's Standpoint;" Miss Lewis, Dietitian at Forrest Park Junior and Senior High School, spoke on "Cafeterias from the Dietitian's Standpoint." There was a good attendance, including a class in Institutional Management from College Park and student dietitians from Johns Hopkins Hospital. Miss Tatman, dietitian at Polytechnic served refreshments in the Faculty room.

The Staff of the Sheppard and Pratt Hospital of Towson, Maryland, invited the Baltimore Dietetic Association to a delightful picnic supper served at their Casino in September. Alma Bering, chief dietitian and former President of the Association, was hostess of the evening.

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Marian Lucas has accepted a position as assistant dietitian at the Sheppard and Pratt Hospital, Towson, Maryland. Miss Lucas has been dietitian in charge at the State Sanitorium, Maryland, for the past two years. She received her training at the University of Michigan hospital, and has had experience at Mayo Brothers and the New York Montefiore Hospital.

Esther Torbet of Evansville, Indiana, has accepted a position as an assistant dietitian at the Sheppard and Pratt Hospital, Towson, Maryland. Miss Torbet is a graduate of Evansville College, Evansville. She received her training in hospital dietitics at the Indiana University hospital in Indianapolis.

*The British Columbia Dietetic Association* annual dinner meeting was held at Miss Stewart's Corner Tea Room. Dr. Jardine told of the interesting progress in founding and establishing Home Economics at the University of New Zealand. A brief business meeting followed and the report of the Nomination Committee was read and adopted, with the following officers: President, Diana Lee; Vice-President, G. Scovil; Secretary Treasurer, Frances Wyness; Entertaining Committee, Ann McMaster, Ellen Graham and Helen King; Press Reporter, Mrs. E. Campbell.

Miss King entertained the Association at the Royal Columbia Hospital, New Westminister, at the business meeting, when Dr. Robertson spoke on emotional man and how to feed him.

*Chicago Dietetic Association.* In August the members were entertained by Mr. D. J. McKim, at Midlothian Country Club. Golf, bridge and dinner made it an enjoyable and complete afternoon and evening. At the September meeting Dr. F. J. Fogelson, Instructor in Surgery, Department of Experimental Surgery at Northwestern University, spoke on "The Present Status of Mucin in the Treatment of Peptic Ulcer." The program of the October meeting comprised reports of the American Dietetic Association convention by the following people: Genevieve Gormican, Michael Reese Hospital, Social Service; Elsie Nelson, Mercy Hospital, Gary, Indiana, Administrative; Beulah hunzicker, Presbyterian Hospital, Diet Therapy; Clara Kurtz, Infant Welfare Society, Community Health.

A baby daughter was born to Mrs Dorothy Richmond on October 28, 1931. Mrs. Richmond will be remembered as the former Business Manager of the American Dietetic Association.

*The District of Columbia Dietetic Association* held its first fall meeting at St. Elizabeth's Hospital in September. Dr. William White, Superintendent of the hospital, welcomed the members of the association. Mrs. A. Henderson of Bond Bread Company spoke on "Introducing Vitamin D in Bond Bread." The members made a tour of the new medical and surgical building on the grounds.

Lucille Refshauge, formerly of Gallinger Municipal Hospital, resigned as Vice President of the District of Columbia Association and is now located at Tucson, Arizona. Emma Tornwall of Tuberculosis Hospital has been elected to take her place. Eleanor Enright of the Washington Dairy Council has resigned as treasurer and Mabel Ashenfelter of the Mall Cafeterias has been elected.

Eva Marks, formerly of Metropolitan Hospital, New York City, and Bessie Lay of Coeburn, Virginia, have accepted positions at Gallinger Hospital.

Mrs. Mabel Williams of Washington, D. C., has joined the Association.

*The Massachusetts Dietetic Association* elected the following officers for the year 1931–1932: President, Rosina Vance, Baker Memorial Hospital, Boston; Vice President, Charlotte R. Schwamb, West Roxbury, Massachusetts; Corresponding Secretary, Beatrice Clark, N. E. Deaconess Hospital, Boston; Recording Secretary, Barbara Wilson, Newton Schools, Newton, Massachusetts; Treasurer, Mary Robertson, Massachusetts Memorial Hospital, Boston; and

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By ALICE V. BRADLEY, *Supervisor and Instructor of Nutrition and Health Education, State Teachers' College, Santa Barbara, California*

28 TABLES OF FOOD VALUES

Table 8. EGGS

| Kind | Measure | Total | Weight in Grams | | Carbohydrate | Total Calories | Mineral Shares | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Protein | Fat | | | Calcium | Phosphorus | Iron |
| Eggs: | | | | | | | | | |
| A la goldenrod | ½ C | 174 | 13.5 | 13.5 | 30 | 295 | 11.07 | 6.78 | 4.62 |
| Omelet, plain | 1 | 65 | 8.1 | 5 6 | 1 | 87 | 1.49 | 2.05 | 3.19 |
| Scrambled | ½ C or 1 egg | 52 | 6.03 | 9 | – | 105 | 1.9 | 2.8 | 4.26 |
| Timbale | ½ C or 1 | 110 | 10 | 8 | 4 | 128 | 9.9 | 5.52 | 3.64 |
| Whole E P | 1 | 45 | 6.03 | 4.72 | – | 66 | 1.31 | 1.85 | 2.74 |
| Whites | 7 | 196 | 24 2 | 4 | – | 100 | 1.2 | .62 | .40 |
| Whites | 1 | 28 | 3 5 | .06 | – | 14 | .18 | .07 | .05 |
| Yolks | 1 | 16 | 2.75 | 5 | – | 56 | .94 | 2.9 | 2.75 |

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The October and November meetings were held at the Women's Republican club and the following papers were presented: "The Application of Research to Commercial Canning," Ruth Atwater; "The Place of the Dietitian in the Public Health Program," Elizabeth G. Fox.

*The Milwaukee Dietetic Association* held its last meeting of the season in May at the New Milwaukee Children's Hospital Convalescent Home with Nell Clauson acting as hostess. After a picnic supper, an interesting talk was given by Bena Henderson, Superintendent of the Children's Hospital. Mrs. Colette Host Gingrass, chairman of the program committee presented an outline of the 1931–1932 program.

The officers for the coming year are Nell Clauson, President; Mrs. Colette Host Gingrass, Vice President; Katherine Lambert, Secretary; and Alice Brenckle, Treasurer.

*The Minnesota Dietetic Association* held its first meeting of the year at Millard Hall, University of Minnesota, on October 5. Dr. J. A. Christianson, Principal of the School of Agriculture at the University of Minnesota, addressed the group on "The Education of the Employee in the Food Department." He stressed mainly the need of educational and social guidance for the employee in addition to the necessary vocational training.

Gertrude Thomas, Director of Dietetics at the University Hospital, read a paper on "The Essential Requirements in the Organization and Management of an Efficient Dietary Department in the Hospital." The paper had been previously read before the Protestant Hospital Association Convention at Toronto.

Reports were given by the chairmen of the various committees and plans outlined for the year's program.

Ida Tuttle is now associated with Wrigley's cafeterias in Minneapolis. Miss Tuttle was formerly assistant dietitian at St. Luke's Hospital, St. Paul.

The Association extends its best wishes to the former Irene Andrews, who is now Mrs. Wallace Rolen. Mr. Rolen is an agricultural chemist with the Kraft Cheese Company.

The Minnesota group was represented at the Dietetic Convention at Cincinnati by Ethel Gough of Minneapolis General Hospital and Gertrude Thomas of University Hospital. Previous to the Convention, Miss Gough visited several Chicago hospitals and also Johns Hopkins Hospital.

*The Ontario Dietetic Association* held its first business meeting of the year at Christie St. Hospital in September when plans for the coming year were discussed. The following is a résumé of the meetings held during 1930–31; November, Mrs. McKinnon, Director of the Visiting Housekeepers' Association for Toronto; December, Dr. Alan Brown, Chief Physician at the Hospital for Sick Children, "Laboratory Work in the Development of New Health Foods such as Sun Wheat Biscuits"; January, Lorena Richardson, chief dietitian of the Robert Simpson Co., spoke on commercial work and Evelyn Westman, dietitian at the St. George School for Child Study, spoke on dietary problems at the Nursery School; February, Dr. Norma Ford, Department of Biology, University of Toronto, gave a lecture on genetics in relation to health; April, annual banquet at the University Women's Club, Prof. Taylor gave an illustrated lecture on Palestine; and May, business meeting and trip through the Dietary Dep't. of the new wing of the Toronto General Hospital, under the direction of Mame Porter.

Miss Winifred Downey has accepted a position in Bermuda, and Mrs. Hilliary (Audrey Willard) is now living in Seattle, Washington.

*The Oregon Dietetic Association* held its regular monthly meeting in the auditorium of the Dohrman Hotel Supply Company,

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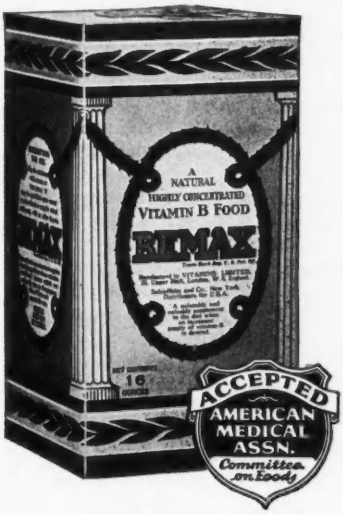


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October 14. Following a brief business meeting the members listened to a discussion on the porcelain and silver features of tray service. The latest in hospital and restaurant kitchen equipment was on display for the benefit of those attending.

Estelle E. Nesbitt, formerly of the Municipal Tuberculosis Sanitarium Chicago, and now director of the dietary department, Hartford Retreat, Hartford, Connecticut, was incorrectly stated to have been formerly connected with the Presbyterian Hospital, New York City, in the September Journal.

An interesting letter was received from Wilda Bradshaw, of Hackett Medical College, Canton, China, in which she says: "From last June until March this year we lived in Canton because of U. S. Consular advice. From March until June this year we lived in Linchow, so if you would really like to be on the *move* I advise you to come to China. . . . at Linchow there are millions of people in the district and not a hospital or a trained nurse except at our Mission Hospitals. We have two Chinese graduate nurses who started a little training school consisting of a class of two girls and three boys. The class and the two graduates comprise our nursing staff for two hospitals. We have between 50 and 60 inpatients and from 30 to 130 in the dispensary three times a week.

"So far we have done little in the way of managing the hospital kitchen. Last spring was made some soy bean milk for some of the patients and found that they liked it. Fortunately the older patients eat bean curd and soy beans, but the children suffer a great deal from improper nourishment. . . . . If we stay in Hackett this year I will very likely get some experience teaching dietetics to Chinese nurses."

Lola C. Lenardson is the new junior assistant dietitian at Vassar Brothers Hospital, Poughkeepsie, N. Y., succeeding Jean Bullis, who is now at Vassar College. Miss Lenardson is a graduate of the University of Minnesota and of student dietitian course at Peter Bent Brigham Hospital.

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THESE and similar comments this past month, from many of the more than 4,000 doctors to whom we have had the privilege of sending copies of the Gerber booklet "Baby's Vegetables and Some Notes on Mealtime Psychology," have amply repaid us for the work attached to the production of this material.

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It had been our hope that the portion of the booklet dealing with mealtime psychology would be particularly helpful to the physician as a piece of literature he might be glad to place in the hands of mothers of his patients—particularly in the hands of first mothers.

This portion of the booklet stresses the importance of establishing a matter-of-fact mealtime routine that will guard against the development of unfavorable mealtime habits. It discusses the prevalence of anorexia, and gives the mother many helpful suggestions for home routine designed to avoid the development of anorexia in the young infant. It also contains much material that should be helpful to the mother who faces the problem of correcting bad mealtime habits already established by the child.

In addition to the gratifying comments received from physicians, we have also had the pleasure of acknowledging numerous expressions of appreciation from mothers for the helpful suggestions they have found in the booklet.

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## WHO'S WHO IN THIS ISSUE

JEAN E. HAWKS received her B.A. degree from the University of Illinois, her M.A. degree under Dr. Ruth Wheeler at the State University of Iowa. She served as dietitian for two years at the City Hospital at Champaign, Illinois, followed by work at the Nelson Morris Research Laboratories in connection with the Michael Reese Hospital, Chicago. There she assisted Dr. Chi Che Wang in the preparation of a number of articles on the metabolism of undernourished children, the effects of high and low protein diets and the basal metabolism of normal and pathological subjects. Miss Hawk's work toward her degree of doctor of philosophy has been done at the University of Chicago. She is now assistant professor of Home Economics at Michigan State College.

DR. FLOYD H. LASHMET is Instructor in Internal Medicine in the Department of Internal Medicine, University of Michigan Medical School. He is particularly interested in problems of kidney infection, in connection with which the striking study presented in this issue has been made.

GLADYS ENKE is a graduate of the Department of Home Economics, University of Minnesota, and took her student dietitian training under Mary Foley with the Kahler Corporation, Rochester, Minnesota. She is now dietitian in charge of ward service at the University Hospital, Ann Arbor, Michigan.

ICIE G. MACY was in charge of Nutrition Research at the Merrill-Palmer School, now taken over by the Children's Fund of Michigan. Carroll F. Shukers, Eva Donelson, Betty Nims, and Helen A. Hunscher were members of the Staff.

HELEN S. MITCHELL received her B.A. degree at Mt. Holyoke College., her Ph.D. in physiological chemistry at Yale Univeristy. She has been Director of Nutrition Research at Battle Creek Sanitarium since 1921 and Professor of Nutrition at Battle Creek College since 1924. Dr. Mitchell is co-author of "Nutrition in Health and Disease."

LILA MILLER received her B.A. and M.A. degrees at the University of Wisconsin. She was Instructor at the Mississippi State College for Women from 1927 to 1929, and is now Research Assistant with Dr. Mitchell and holds a research and teaching fellowship in the Physiological Chemistry Department at the University of Michigan.

FRANCES STERN needs little introduction to the readers of the JOURNAL. She is known throughout the country as an authority on food clinics in the outpatient departments of hospitals, and as a contributor to many publications. Miss Stern is Director of the Food Clinic of the Boston Dispensary, Boston, and former Chairman of the Section of Social Service of the American Dietetic Association.

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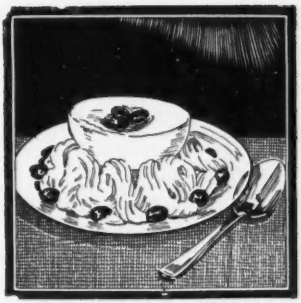

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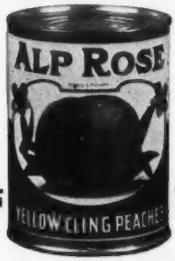
MR. ARNOLD SHIRCLIFFE, Catering Manager of the Belden Stratford, Webster, and Parkway Hotels, Chicago, author of the Edgewater Beach Salad Book, and contributor to *Hotel Monthly*, *Modern Hospital*, and other publications, has had long experience in the commercial field. He has been superintendent of dining car and restaurant service of three large railroads and was in charge of dining car and troup train meal service in France, Belgium, and Germany during the World War.

ELIZABETH DYER, director of the School of Household Administration at the University of Cincinnati, graduated at Vassar and went into social work in Boston. She has had a unique and varied experience in public school, educational and psychological work with retail establishments. While coördinator in the School of Retailing, New York University, she wrote "Textile Fabrics" and assisted in the preparation of the "Merchandise Manual." Her extensive personnel work and contact with psychologists gives her a competent background to consider the problems discussed in her current paper.

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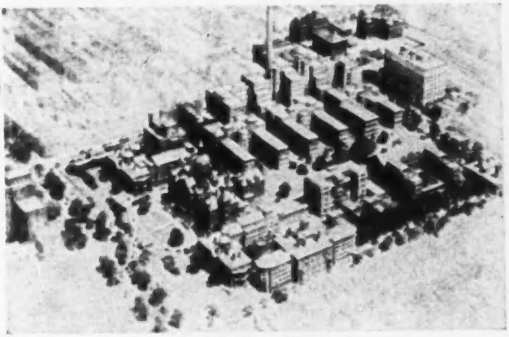

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